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"Educational Orders" for Munitions

Plan to Rotate Contracts for War Material Among Private Plants Essential to Industrial Preparedness

BY LIEUT.-COL. TOWNSEND WHELAN*

EXTREMELY unlikely it is that a democratic nation will engage in a war with which the mass of the people is not in sympathy. In any war in which the United States may engage hereafter there will probably be no difficulty in getting all the man-power needed, either by voluntary enlistment or draft. But more than man-power is needed. Material—weapons, ammunition, transportation, clothing, food, supplies—is required also. This material is needed in the shortest time possible because the waging of a successful war is a matter of speed almost as much as of numbers and power. The army which gets there *first* with an equal or greater number of *well armed* men usually wins. The man-power of the United States is unequaled by that of any other nation, and in all probability there will be no difficulty in obtaining it in the amount and at the rate necessary. But when we examine the probability of obtaining the necessary materials of war in the amounts and on the dates required to supply this man-power, the picture is not so encouraging.

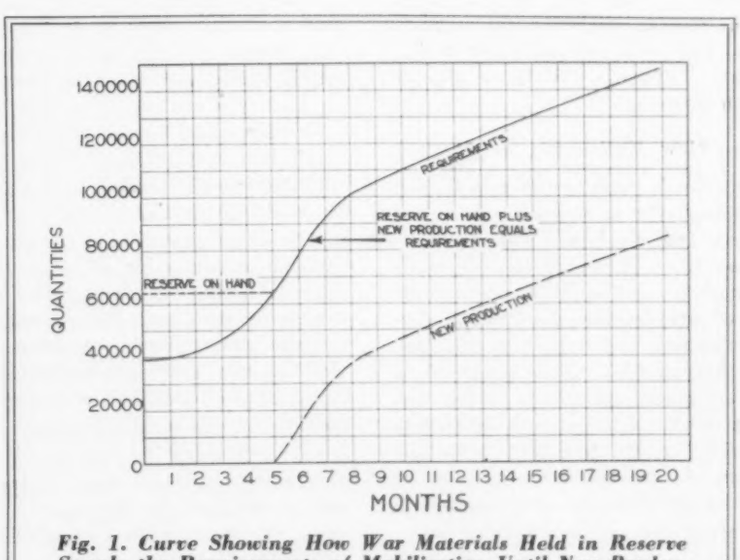


Fig. 1. Curve Showing How War Materials Held in Reserve Supply the Requirements of Mobilization Until New Production Gets Under Way

Reasons for Maintaining Reserves of War Material

No nation can afford to keep on hand a reserve of arms, ammunition and supplies necessary to wage a complete war. The cost of such a reserve and the interest on the investment would be prohibitive. Instead, each modern nation endeavors to maintain a reserve of war material which will last its man-power until such a time as its arsenals and its industrial establishments can take up the burden of manufacture and supply. If our arsenals and our commercial plants can get into small production on a certain type of ammunition five months after declaration of war, and can produce that ammunition in ample quantity after eight months, then the reserve of that ammunition maintained in peace should be that required by all the troops under arms for the first five months and part for the remaining three months.

Fig. 1 shows such an ideal supply curve. But Fig. 2 shows a curve such as this

*Ordnance department United States Army.

country finds itself confronted with in the case of a number of very vital items of equipment and supplies. Constant study and effort is being made by all concerned with national preparedness to eliminate the shortages illustrated hypothetically by Fig. 2. Such shortage may be eliminated either by increasing the reserve or by expediting production. To increase the reserve is extremely expensive, and of course necessitates the appropriation of funds by Congress. In some cases it must be done—there being no alternative. The reserves of certain essential articles are so small as to be a constant matter of anxiety to the War Department. But the military student endeavors first to see if he cannot eliminate most of the shortage by measures taken to hasten production, as the pre-war cost is very much less. The measures taken to hasten production have been termed "industrial preparedness."

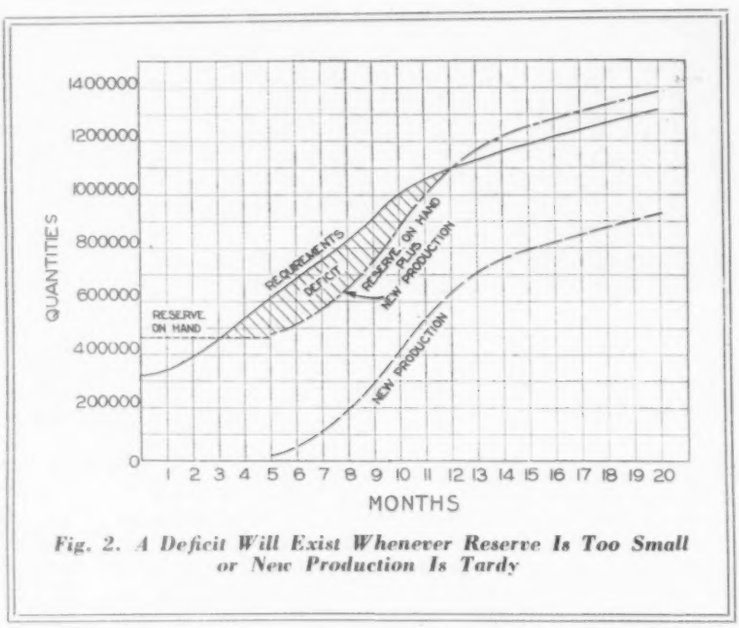


Fig. 2. A Deficit Will Exist Whenever Reserve Is Too Small or New Production Is Tardy

Briefly, industrial preparedness for war in the United States consists in a calculation of all requirements in advance, based on the rate of mobilization of the man-power, the allocating of these requirements to the Government arsenals and to suitable selected industrial plants, and of planning in advance in the matters of power, labor, raw materials and transportation.

The industrial plant to which a war order for the manufacture of supplies is allocated is provided with detailed specifications and manufacturing information covering the article, and is asked to indicate how soon it can get into production on the article, and how soon it can reach the desired peak of production. It is also asked to draw up a war plan covering new equipment needed, bills of material, route sheets, labor, power, transportation, sub-contracts and any other essential step. When these measures are taken, the getting into production on that article is very greatly facilitated. We now know what is wanted and who will make it. The contractor knows what he is to make, and he has laid many of his plans in advance. We have already reached this stage in our plans.

Munitions Manufacture Now Exclusively in Arsenals

But there is still one weak point in the system, for, in too many cases, particularly as regards rifles, cannon, ammunition, tanks and airplanes, the manufacturer does not know *how* to make the article, nor is his plant more than generally suited in its equipment for that particular class of article. He does not understand the art of manufacture, and he is not equipped with the special machinery needed. Practically all of our manufacturers who made munitions during the World War have made no such articles since then; they have lost the art of manufacture, and the special machinery has been scrapped. A very large amount of time will be necessary to learn the art of manufacture and to design and procure the special machine tools, dies, jigs, fixtures and gages needed before production can be started. Conversely, if we can devise a plan which will teach our manufacturers the art of manufacture in time of peace very much time will be gained, the serious shortages will be greatly or entirely eliminated and very large sums of money will be saved the taxpayer.

The art of manufacture is now kept alive in our Government arsenals, which are equipped to manufacture most of the technical articles needed by our army, and which do manufacture a small amount of such material each year to meet the current needs of the army, and to replace deterioration in our reserves. It is very necessary to keep these arsenals alive to the extent that will preserve the art of manufacture, and retain a nucleus of officers, foremen and workmen familiar with the art. Further maintenance of these arsenals is not necessary, but the preparation and training of the commercial plants is vital, for on them will fall the bulk of production in war, as the arsenals have only sufficient capacity to manufacture from 1 to 5 per cent of the material needed, depending upon the particular article.

Obviously, therefore, the proper procedure would be to allocate only such portion of our peacetime manufacture to our arsenals as will be necessary to maintain the art of manufacture at these plants, and to allocate the balance of it in the form of "educational orders" to those plants which have been selected to make the particular article in event of an emergency. For example, suppose during the next five years it is necessary to manufacture 500,000 rounds of ammunition for the 75-mm. field gun for target practice and to replace deterioration in the war reserve of such ammunition. During the next five years we would then allocate say 250,000 rounds to our arsenals, and each year we would allocate 50,000 rounds to some one selected commercial plant. Thus within five years five commercial plants will have experience in manufacture, and each five years or so each plant will renew its experience. Or it may be possible to place orders annually with each selected manufacturer.

This is an entirely hypothetical example, but if some such plan could be put into effect it would result in a small line of machinery being installed in each plant for the manufacture of the article (which line could be easily duplicated in war), in a nucleus of foremen and workmen familiar with all manufacturing operations, in a perfection of plans for reaching mass production in war, including really practical plans for the necessary raw material, power, facilities, labor and transportation. Such education of our selected munitions plants, and such perfection of their war plans might easily result in advancing the date of mass production by one to three months. This would result in some cases in entirely eliminating shortages, in others of making it unnecessary to maintain such large reserves. The money gain to the taxpayer will be enormous, for it has been estimated that a month saved in getting into production will result in a reduction of the value of the reserve required to be maintained by approximately $150,000,000.

It is undeniable that it will cost more to manufacture supplies by the medium of educational orders placed with commercial plants than if these same supplies were made at a Government arsenal. The Government arsenal has complete facilities and is familiar with the work. The commercial plant will have to tool up for its initial educational order, and the planning cost will be high. Also, taking the above hypothetical case, a commercial plant cannot produce 50,000 of a certain article annually at the same unit cost as an arsenal could produce 100,000 in the same time.

Our selected commercial plants have been consulted relative to this plan for educational orders. They are a unit in stating that, more than anything else, it will result in a perfection of their war plans and in their getting into production in an emergency at a very much earlier date than would be possible without such educational orders. Moreover, they have quite generally indicated in a patriotic manner that they would be willing to undertake such orders on a cost basis. The plants which the ordnance department has selected for its war manufacture are almost all such large industrial concerns that such educational orders as would be placed with them would be a mere fraction of their regular annual commercial production.

The increased cost of educational orders over arsenal orders is a price we should pay for an exceedingly cheap form of insurance against shortages in war and will be money well spent. It should also be understood that the placing of educational orders does not necessarily mean a large increase of the amount of money appropriated annually for munitions supplies. It is in general merely contemplated that the money now appropriated annually for the procurement of current supplies shall be utilized to procure those supplies in a little different manner which, in the end, may be slightly more expensive, but which will add very greatly to our state of preparedness against war.

Present Legal Obstacles

Most unfortunately the law does not now permit the placing of such educational orders with commercial plants. The second paragraph of Section 5a of the National Defense Act now reads:

> * * * He (the Secretary of War) shall cause to be manufactured or produced at the Government arsenals or Government-owned factories of the United States all such supplies or articles needed by the War Department as said arsenals or Government-owned factories are capable of manufacturing or producing upon an economical basis.

As our Government arsenals can produce the vast majority of ordnance material and supplies needed in time of peace upon an economical basis, it follows that it is impossible to place even a small proportion of these orders with commercial plants.

There are also other existing laws which hamper the War Department in this connection, such as Section 3709 R. S., which provides that all contracts shall be made by advertising and in effect awarded to the lowest responsible bidder. Such procedure would defeat the purpose for which orders for ordnance would be placed with commercial plants, for awards in all probability could seldom be made to those well equipped and responsible manufacturers with whom the War Department has allocated orders for the manufacture of supplies in war, and whom it is desired to train in peace for such manufacture. Instead it is very likely that, under the present laws, such contracts would have to be awarded to some manufacturer who was the lowest bidder, because of his desire for work which would carry his overhead over a lean period, or for some other reason, and who might not be equipped or organized in a way that would permit of his producing quickly and in enormous quantities in war. It would be of little benefit from the standpoint of preparedness to have educational orders placed with such firms. They should be distributed among all the plants to whom war orders have been allocated in conformity with the well formulated plans for industrial mobilization.

In order to permit educational orders to be placed in the manner which will best secure the results desired, the War Department recommended introduction of a bill in the last Congress and reintroduction in the present Congress (H R 450, H R 5662 and S 1824), which provides that:

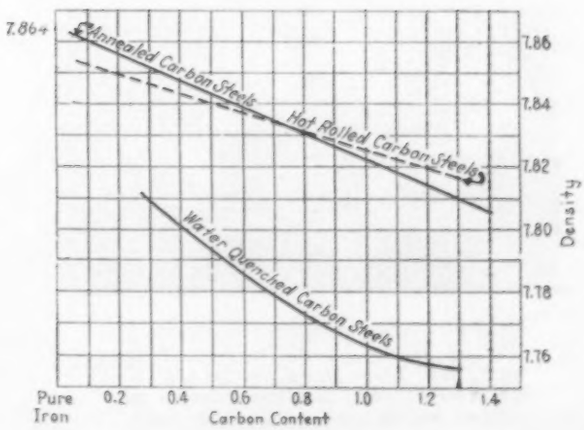
> The Secretary of War may authorize the placing of educational orders for equipment, munitions and accessories needed in the military service with commercial concerns to the degree that is considered by him as being necessary to familiarize commercial factories with munitions manufacture and to advance the industrial war plans of the War Department, and in placing these educational orders the competitive bids which in his opinion best secure these results may be accepted; and he shall make statement of his action under this provision in his annual report.

It is believed that this bill should be enacted into law as soon as practicable. It will place the nation in a far better state of preparedness as to its munitions supply for possible war than it now is. Should it become a law, the resultant training of our commercial plants in the art of manufacturing munitions, together with the other well formulated plans and measures of the War Department looking to industrial mobilization in war, will go a very long way toward insurance against war. What we are interested in is achieving a state of industrial preparedness which will match our unrivaled man-power with adequate munitions-power, so that our country will be secure from attack by any power or combination of powers. We are planning for peace, continued peace, and we think we have hit on a logical way to insure it, not by the mere expression of a pious wish, but by commanding it.

Density of Plain Carbon Steels, As Rolled, and After Heat Treatment

H. C. CROSS and E. E. Hill have studied the "Density of Hot-Rolled and Heat-Treated Carbon Steels," and their results are published in Scientific Paper No. 562 of the Bureau of Standards.

Four samples of the purest commercial and electrolytic irons available closely approximated the average density (7.864 gm. per cu. cm.) despite large difference in previous history. Density of hot rolled commercial steels decrease slightly with increasing carbon content. Annealed steels vary a trifle from these figures. In samples chosen of such size that the structure would be martensitic after water quenching from above Ac_3, the density decreased considerably. Tempering to various increasing temperatures restored the density gradually to the figures for annealed specimens. Principal data are summarized in the diagram shown at the right, adapted from Messrs. Cross and Hill's work.



Whirlwind Engine Parts Receive Careful Handling

Thorough Inspection Made at Every Stage of Manufacture—Cylinders and Cylinder Heads Machined on Production Basis

BY FAY LEONE FAUROTE*

ALMOST within a year, namely, from May 9, 1926, when Commander Byrd and Floyd Bennett flew from King's Bay, Spitzbergen, to the North Pole and return in 15½ hours in a Fokker monoplane equipped with three Wright Whirlwind engines, to July 12, 1927, when Edward A. Stinson in a Stinson Whirlwind-engined monoplane covered more than 4000 miles in the National Air Tour, eight major records, the greatest in aviation history, were made. Six of these were made over oceans and included the splendid flight of Lindbergh, that of Chamberlin and Levine, that of Lieuts. Maitland and Hegenberger across the Pacific, that of Commander Byrd and his three associates, and the flight across the Pacific by Ernest L. Smith and Emory B. Bronte.

To these spectacular accomplishments has been added the good-will tour of Col. Charles A. Lindbergh in his Ryan monoplane, the Spirit of St. Louis. This tour through Mexico, Central America, a portion of South America, the islands of the West Indies and Cuba, began on Dec. 13, 1927, with a non-stop flight from Washington to Mexico City, the distance covered in this leg of the flight being 2000 miles and the flying time, 27 hours. At the finish of the tour, at St. Louis on Feb. 13, Colonel Lindbergh had spent more than 116 hours in the air and had traveled more than 9000 miles. When such records are remembered, it is hardly to be wondered that the world generally and metal workers in particular are interested in knowing something of how the Wright Whirlwind engine is built.

It is the purpose of this and the succeeding article to describe some of the operations performed upon the cylinder, cylinder head, pistons, connecting rod, crankcase and other parts of this famous power plant, as well as to show how some of the major parts are assembled.

At the outset, it should be said that no piece of commercial mechanism that I have seen assembled gets greater care and more careful handling at all stages. I was very much impressed by the manner in which all the parts are protected between operations, the care taken to make sure that the castings are thoroughly cleaned, and parts of metal that might afterward cause failure eliminated, the attention paid to weight, and the sincere seeking after fine workmanship. In general, one had the feeling of being in a tool room rather than in a manufacturing shop. Nor is it to be wondered at when one considers the great responsibility which is actually carried by the workmen themselves in the manufacture of this engine. Only when its motor is in operation is an airplane an airplane; failure of its engine is disastrous—you cannot tow it home. It falls to the earth or sea, a broken thing, a lifeless piece of junk; that is, unless one is within gliding distance of a field. This, of course, usually happens in flight over land but not always over water. There to fall is to perish.

Workmen Realize Their Responsibility

A very intelligent class of men is employed in the Wright shops. Their obvious seriousness and realization of their responsibility, their great willingness to do everything within their power to insure the lives of the daring pilots who will afterward use these power plants, are evidenced throughout. Since operations at the Wright Aeronautical plant are on a quality manufacturing basis, all parts are governed by carefully prepared drawings, operation and instruction sheets and routed through the shops according to a definite schedule. The usual special tools, such as jigs and fixtures which must be used in large

*Mechanical engineer, New York, and former editor of the *Aircraft Yearbook*. This is the second of a series of articles on the Wright Whirlwind engine, the first having appeared in THE IRON AGE of Feb. 9, pages 394 to 397.

AFTER Annealing, the Cylinder Barrel Is Rough Machined All Over and Put Through a Series of Heat Treatments. The finished cylinder head and barrel are shown at the right

production to assure interchangeability of parts, a point vitally necessary in the manufacture of this power plant, are to be found throughout. Although standard machines are used for most operations, considerable ingenuity has been shown in the manner in which some of these standard tools have been adapted to the work at hand. The output, of course, has not yet reached the point where mass production is possible or desirable. There are no conveyor systems, no overhead trolleys or monorails, no slide ways or rollways. There are a number of assembly jigs mounted on casters, and in general it may be said that for the purposes for which they are used these are ample at the present stage of manufacture.

While the company makes its own aluminum-alloy and bronze castings, its steels are bought from outside vendors in rough-finished form according to rigid chemical and physical specifications.

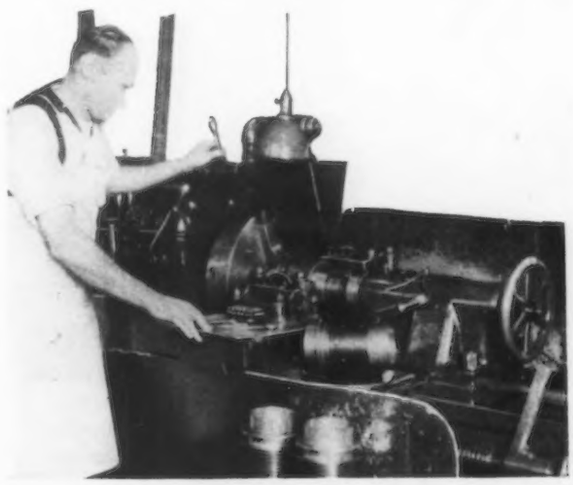
Machining and Assembling of Cylinder Unique

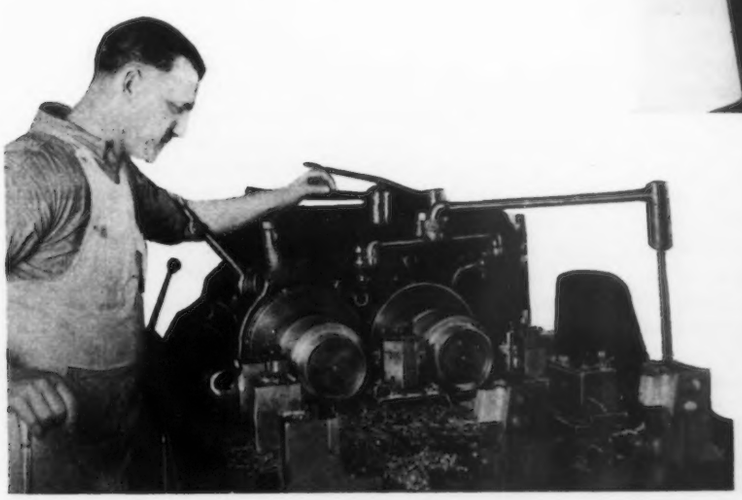
The manner in which the cylinder is machined and assembled is interesting. The resulting product is unique. The cylinder barrel, shown in an accompanying illustration, comes into the shop as a forging of special steel. After being annealed it is rough-machined all over and put through a series of heat treatments. A Brinell hardness tester is used for checking the hardness. The cylinder barrels are then put two at a time on a double-spindle turret lathe where they are bored and faced. The outside diameter is also turned up on a similar lathe, the work being held on an expansion arbor. Following these operations the barrels are placed in a heavy-duty automatic lathe where 14 fins, approximately 13/16-in. deep and 1/64-in. thick at the top, are cut from the solid barrel. The fins are tapered with a separate tool fastened to the top of one of the tool blocks of the same lathe, the taper being from 0.030 to 0.060 in. Two sets of tools, one on each side, operate simultaneously on the work. I was informed that an extra set of tool blocks was being put into condition while the other set was in operation on the work. Operation is continuous, the machine being stopped only when the tools become dull or the work is changed.

A thread miller then cuts the threads on the upper end of the barrels which are cut 0.013 in. oversize to take care of the shrink fit in the cylinder head. Minor operations on this part are the facing of the end to a close dimension from the flange, and the forming of the back of the flange.

Cylinder Head a Machine-Molded Aluminum-Alloy Casting

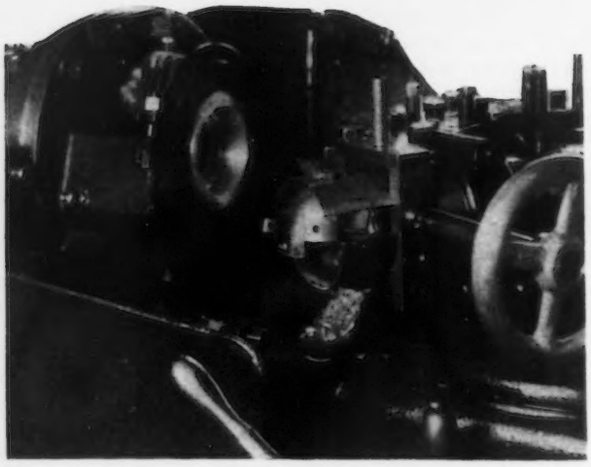
The aluminum-alloy casting for the cylinder head is produced in the Wright foundry where molding machines and special chilled cores make rapid production of good quality possible. In this department





CYLINDER Barrels Are Turned on the Double-Spindle Turret Lathe Above, and Cooling Fins Are Formed on the Machine at Upper Right. The Mult-Au-Matic, at lower right, is set up for machining cylinder barrels, and will also be used for cylinder heads

one is impressed with the liberal-sized sprues used and the excess metal which is included to secure sound castings that will not reveal internal defects after machining is partially done. The aluminum for the cylinder heads and pistons is the Y alloy, the composition of which is approximately as follows: Copper, 4 per cent; nickel, 2 per cent; magnesium, 1.5 per cent; iron, 0.75 per cent; silicon, 0.50 per cent, and aluminum, 91.25 per cent. Each of these castings is thoroughly cleaned and sandblasted, and then subjected to a 70-lb. air pressure test for defects, after which it is heat treated to normalize the interior. The part is then chucked on the inside diameter of the open end and the first fin is turned to a close-dimension diameter. A ⅜-in. hole is then drilled in the dome



MOLDS for Cylinder Head Casting Are Made on Machine at Left. Boring, facing, forming the dome and threading of the head are done on turret lathe above

end of the cylinder head, the object of this small bottom hole being to provide a stop for the boring fixture used on the next machining operation. It also determines the wall thickness and assures a uniform compression chamber in the cylinder. Rough-facing the open end and rough-forming of the dome are now performed on a heavy upright drill using combination tools. Finishing is done on a turret lathe. This operation includes boring and threading of cylinder bore. A Bullard Mult-Au-Matic is now being installed to handle this work, as well as a sequence of operations on the cylinder barrel.

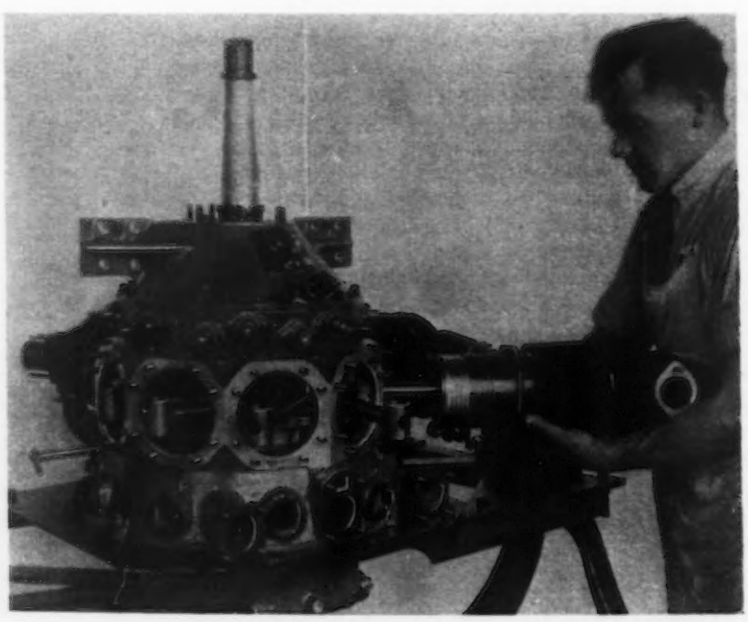
Before any further machine work is done, the cylinder head is subjected to a severe water test. All openings are plugged and water is forced into the cavity by pump until a pressure of 600 lb. per sq. in. is reached. If there is any evidence of leakage, the cylinder head is rejected.

Rough and finish facing and boring of the exhaust port, used as a locating point on future operations, is next in process. An upright drill press fitted with special fixtures and combination boring and facing tools takes care of these operations. Similar boring and facing and tapping operations are then performed on the intake port side, these also being done by an upright drill press. Then comes the drilling and tapping of the two spark-plug insert holes, one on each side of the cylinder. They are counterbored on the inside with special back-facing counterbores. The rocker-box pads are next milled on a vertical milling machine having a special index fixture. Then comes the boring of the valve guide holes and the seats for the valve seat inserts.

The cylinder heads are then placed in a furnace and heated to 650 deg. Fahr. so that the valve seat holes are expanded sufficiently to permit insertion of the bronze valve seats. As soon as this operation is completed and the cylinder heads are cool they are placed in a fixture and the lower part of the valve seat is spun into its anchorage. They are formed to a gage to insure uniform seats. The drilling and tapping of the small holes is done on sensitive drill presses. The part is then carefully inspected and if pronounced fit, is ready for assembly with the cylinder barrel. Before this operation can take place, however, the cylinder head is again heated in a gas furnace to 650 deg. Fahr., after which it is placed on an assembly stand and the cylinder barrel quickly screwed in place. The intake pipe flange is assembled at the same time. The whole job is put through a final pressure test of 600 lb. per sq. in.

Eight holes are drilled in the cylinder barrel flange on a multiple-spindle drill press. The flanges are milled with slotting saws in a gang set-up. The spark plug inserts are screwed and anchored in place and the valve guides pressed into position, after which the whole assembly is spray-enamelled all over and baked in a standard oven.

Internal grinders are used for the next operation which is the grinding of the entire cylinder assembly. A perfect, polished bearing surface is secured by a honing operation which follows the grinding. At this point all cylinders are checked carefully and the percentage of bearing is calculated. All studs are screwed in place, great care being taken that none of them is subjected to torsional stress. Indeed, to make sure



ASSEMBLY of the Cylinder in the Engine Is Preceded by Painstaking Inspection

that there is no such stress a straight line is scribed the entire length of the unthreaded portion. If the thread is, therefore, twisted in the least it can be readily detected. As the job is now ready for the engine assembly, it is again painstakingly inspected and placed in individual compartment trays to be forwarded to the assembly section. An inspection of the accompanying illustration of the assembly of the cylinder in the engine will show what a clean workmanlike job this is.

Precautions for Hammer Operators

Simple Safety First Measures Adopted by Drop Forging Institute—Data on Manufacture of Satisfactory Keys

BULLETIN 451 of the United States Bureau of Labor Statistics contains the "Safety Code for Forging and Hot Metal Stamping" recently adopted by the American Drop Forging Institute, National Safety Council and American Engineering Standards Committee. It recommends that the following operating rules be posted prominently and strictly enforced:

Operating Rules

Changing Dies and Repairing.—Always block the hammer, shear or punch substantially, using steel blocks on hydraulic presses. Make sure operating mechanism is closed, locked and protected against accidental opening.

Board Drop Hammers.—When replacing board, keep hands away from ram. When adjusting mechanism, keep hands from under roll-releasing devices or from over the knock-off.

Keys must not project.

Idle equipment at noon and at night should be left with hammer resting on anvil.

Mushroomed tools must be repaired immediately.

Tongs or *forks* must be used in handling metal. Cold metal parts must be handled with tongs or picks long enough to prevent hands from getting between dies.

Quenched forgings for quick inspection should be reheated to draw temper and prevent accidents in further operation.

Goggles must be used by hammer men, heaters, helpers and cold-trim press operators.

Clothing.—Leather or asbestos aprons, gloves with asbestos or leather palms, congress shoes and leggings must be used by men handling hot metal. Wear hand leathers in moving rough cold stock.

Furnaces should be lighted by oily waste placed in front of burners. Open all doors, use long tongs and stand aside to avoid explosion or flare back. Turn on air slowly.

Handling Dies.—Threaded countersunk holes in all dies should be provided at convenient places so rods, screwed in, can be used for handling and adjusting. Minimum sizes follow:

Weight of Dies	Number of Holes	Depth	Diameter
200 to 500 lb.	2	2 in.	¾ in.
500 to 1000 lb.	2	2 in.	⅞ in.
1000 lb. or more....	4	3 in.	1 in.

Transfer Boards Prohibited.—To move dies from bench to machine use transfer truck and chain block.

Other Safety Precautions

The code recommends that aisles should be at least 4 ft. 6 in. wide, properly marked, kept clear of everything except moving traffic. Machines should be so arranged that operators stand between them, clear of the aisles.

Many items of safety equipment are noted, such as gear guards, valve locks and fan screens. Steam hammers should have springs to prevent piston (not piston rod) striking upper cylinder head. Hot steam pipes should be guarded. In mechanical hammers, where the work is so small it can be held in a one-hand tong, the machine should be operated by hand lever, rather than foot treadle. If the work is placed in the lower die and not held by hand, a guard should descend before the hammer falls, or else the operation should depend on two hand levers. Substantial pulley keepers should be installed to prevent pulley or flywheel from falling should the shaft break. Board hammers should have inclosures so that a broken board will not topple down on the operator; railed platforms should be provided for adjusting the overhead mechanisms.

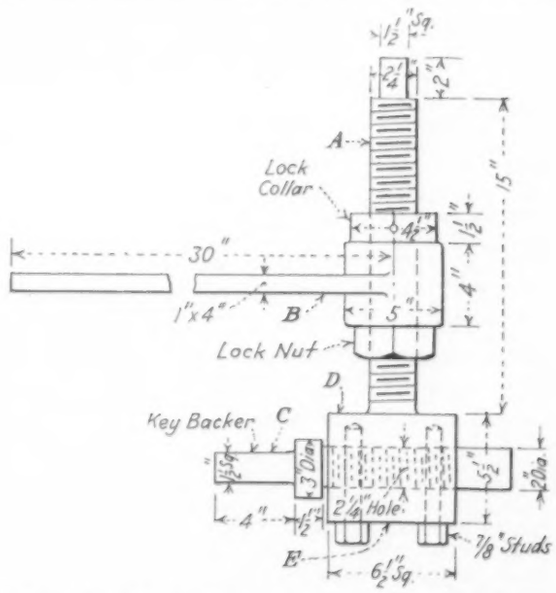
Shears should have their maximum capacity in temper and size prominently placarded, thus: "Limit, 0.30 to 0.40 per cent carbon, 3½ in. square, 4 in. round, 1½ by 8 in. flat."

Manufacture of Keys

Loose fitting, bruised or protruding keys have been the cause of so many accidents that the code gives these definite recommendations on key manufacture:

Hammer die keys shall be of material that will not crack or splinter or fly off, and shall not project so as to endanger workmen.

Note.—It is suggested that hammer die keys be made of open-hearth material (manganese, 0.40 to 0.50 per cent; carbon, 0.50 to 0.60 per cent); that they be machined accurately to fit notches, and that the ends be tempered to prevent spreading, upsetting, or breaking. The ends of keys should be redressed when necessary. For backing out keys a "key backer" held by a fixture is recommended, such as the one illustrated.



Holder for Key Backer. Part "A" is a threaded round bar enlarged to a square end "D." This end has a cap "E" with a round hole in which part "C" moves freely. Part "B" is a flat piece that screws up and down on bar "A." To operate it, part "B" is placed on the lower die and so adjusted that the left-hand end of part "C" is opposite the die key. The hammer is then lowered on top of part "B" to hold it firmly between the upper and lower dies, and part "C" is struck with a ram to drive out the key

Another method which has been found satisfactory is to use softer keys (carbon, 0.37 to 0.50 per cent), heat treated by quenching in oil until black and then cooling in the air. These keys upset before they split. This necessitates frequent dressing but is reported to be much better than using hard keys. If the small end of the key upsets before it starts out of the die, the key is driven up as far as possible, then the end is burned off with an acetylene torch and the key driven out.

Wheelock, Lovejoy & Co., Inc., distributer of alloy and tool steels, has removed its Chicago office from 5 North LaSalle Street to the Pure Oil Building, 35 East Wacker Drive.

Blast Furnace and Open-Hearth Topics Feature Technical Meetings

Mining and Metallurgical Engineers Hold Large Convention—Railroad and Other Steels Discussed —Secretary Hoover Signally Honored

SOME excellent papers on blast furnace, open-hearth and other steel problems and an ovation to Secretary Hoover were features of the 136th general meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 20 to 24. With an attendance of about 2000 members and guests, the convention was one of the largest ever held by the institute.

The tribute to Herbert Hoover, a past-president of the institute, was made when the Saunders medal was conferred on him at the largest banquet in the organization's history. Other prominent metallurgists were also honored. The chief features of the technical papers, delivered at five sessions, are reviewed in the following columns.

Modern Blast Furnace Problems Reviewed

SEVERAL valuable papers were presented at the session on blast furnaces, but unfortunately the attendance was very small. The character of the papers was such that a larger attendance and a broader discussion were merited. George P. Hansen, American Rolling Mill Co., Ashland, Ky., acted as chairman in place of Ralph H. Sweetser, who was confined to his home because of illness.

Blast Furnace Life Prolonged

Some important new developments in blast furnace construction were offered by J. P. Dovel, vice-president Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., in a paper entitled "Improvements in Blast Furnace Construction," pointing out that the expense of replacement and relining of a blast furnace may consume all the profits made while it is in operation. The author described various steps taken in altering the construction so as to make it permanent. It has been possible to install a permanent hearth in one of his company's furnaces by making it of heavy cast iron sections with machined and lap joints, bound together with wrought iron bands which can be repaired from the outside without blowing out. The whole bosh is incased in metal and does not depend upon its brick work to any extent. The author reports that the oldest structure of this type has been in service 11 years and as it is still in perfect condition a longer service will be needed to establish its permanency.

Frequent and early failures in the inwall section above the mantel were dealt with by inserting a series of rows of bronze cooling-plates from the outside, attached to and supported by the shell, which after five years' service is still in good condition. Permanency of the top has been accomplished by discarding the brick in the top section and substituting a heavy cast steel jacket lined with cast iron blocks which withstand the wear and make a permanent stock-line. Flue dust production is claimed to be reduced, as well as coke consumption, at the same time increasing the capacity of the furnace.

Discussion

C. A. Meissner, United States Steel Corporation, New York, in commenting on the paper, said that Mr. Dovel has blazed the way in making it possible to increase the stock-line and other parts of the furnaces, at the same time reducing flue dust production. Conditions, however, in the South are much different from those in the North in blast furnace operation. In the North flue dust production is very heavy, involving a large loss of ore already paid for. This flue dust runs as high as 49 to 50 per cent iron, while in the South the dust contains not more than 30 to 35 per cent of iron. The adoption of Mr. Dovel's devices in the North depends a good deal on the extent to which they will reduce flue dust production, said Mr. Meissner.

Studies Metallurgy of Lime and Dolomite

A valuable contribution to the metallurgical problems involved in the use of limestone and dolomite

GEORGE OTIS SMITH

Institute's New President Is Mr. Smith, Director of the United States Geological Survey. Mr. Hibbard was the Howe Memorial Lecturer for 1928

HENRY D. HIBBARD

was offered by Oliver Bowles, supervising engineer Non-Metallic Minerals Experiment Station, United States Bureau of Mines, New Brunswick, N. J., in a paper entitled "Utilization Problems of Metallurgical Limestone and Dolomite." Mr. Bowles points out that relatively little study has been given to the nearly 24,000,000 tons of limestone and dolomite used each year metallurgically. His paper is based on an extensive review of metallurgical literature, and consists of an exposition of some of the facts based thereon. He discusses blast furnace flux, its action in the furnace, the effect of impurities on fluxing stone and offers a formula for calculating the relative values of different grades of flux. The slagging effect of magnesia and its function as a remover of sulphur, as well as its effect on slag viscosity, are gone into. The size of stone for blast furnace flux is also reviewed, as well as the use of impure fluxing material. Basic open-hearth flux is discussed along similar lines, concluding with an analysis of the problems in the use of dolomite as a furnace lining.

Discussion

In the discussion George C. Stone, chief metallurgist New Jersey Zinc Co., said that, in making spiegeleisen, magnesia is much more effective than calcium, and J. T. McKenzie, chief chemist American Cast Iron Pipe Co., Birmingham, Ala., described the use of dolomite for slagging in the cupola. He had found that less dolomite than limestone was necessary and that better results were obtained by using ½-in. to 1-in. stone instead of larger sizes. The question of the use of limestone or burnt lime in open-hearth practice was touched on by L. F. Reinartz, American Rolling Mill Co., Middletown, Ohio, who said that burnt lime gives faster heat, but limestone, because of the larger boil, produces cleaner metal.

Coal Cleaning Methods Reviewed

A paper that was considered valuable to blast furnace men in general was one entitled "Cleaning Bituminous Coal," by J. R. Campbell, American Rheolaveur Corporation, Scottdale, Pa. The author discusses various methods of cleaning coal, both wet and dry. Curves were thrown on the screen, illustrating results in ash and sulphur removal by the use of various methods on different grades of coal. In general the author emphasized the following fundamentals in the mechanical cleaning of bituminous coal: Necessity of washability studies, type of plant adaptable to the coal studied, plant control in performance, and all factors in the cost of washing.

SECRETARY HOOVER
Awarded Saunders Medal

Discussion

The wisdom of putting this paper in a blast furnace session was commended by C. A. Meissner, who said that clean coal means clean coke, a very important consideration in making good pig iron. Commending the paper for its thoroughness, Mr. Meissner said he prefers the dry method of cleaning, and stated that we need more coal cleaned. While the quality of coke has been improved, a uniform pig iron is insured by the use of uniform coke, which can be made more certain by proper cleaning of the coal.

Gas Washing Methods Contrasted

A comparison of American and German methods of washing blast furnace gas was contributed in a paper by Arthur J. Boynton, vice-president H. A. Brassert & Co., Chicago, entitled "Gas Washing." The author states that the logical order in the use of blast furnace gas is as follows: In hot blast stoves, in gas engines where such engines exist, in open-hearth and mill heating, in coke oven underfiring, and under boilers. After discussing the wet cleaning method and its various phases, Mr. Boynton goes into some detail discussing the Halberger-Beth system in Germany, and then devotes some space to the newest method of gas purification and one which is exciting considerable interest on the part of all German iron and steel men, the electrical precipitation system. Some of the results obtained from this in the United States and Germany, as well as the costs of various systems, are dwelt upon. "The reduction in the cost of steel possible through the proper application of washed blast furnace gas remains the most important single unrealized means of reducing the cost of American steel." In the meantime, says the author, wet cleaning by the disintegrator method remains the simplest, cheapest and most flexible of the thoroughly tried systems developed by Continental experiments.

Other Papers

The subject of high alumina slags in blast furnace operation was covered in a paper entitled "Production of High Alumina Slags in the Blast Furnace," by T. L. Joseph, S. P. Kinney and C. E. Wood of the Bureau of Mines. A paper on the program which was not presented was entitled "Operation of the Blast Furnace Plant, Columbia Steel Corporation, Ironton, Utah," by W. R. Phibbs, general superintendent Columbia Steel Corporation, Provo, Utah.

Open-Hearth Session Features Metallurgical Topics

FIVE papers were scheduled for the session of the open-hearth committee, Tuesday afternoon. Leo F. Reinartz, assistant general superintendent American Rolling Mill Co., Middletown, Ohio, presided. Brief abstracts of two of the papers, which were summarized by their authors, are given in the following paragraphs, together with the main features of the discussions which followed each paper. A third paper, describing a 1-ton open-hearth furnace and telling of results of its operation, will be published, in abstract, separately. The two other papers were not heard, as the authors were not present and the papers had not been preprinted.

Elimination of Carbon

Rate of elimination of carbon largely controls the time required to make a heat of steel by the basic open-hearth process and to an important degree determines the cost of refining, according to Alexander L. Feild, metallurgist Union Carbide and Carbon Research Laboratories, Inc., Long Island City, N. Y., in a paper entitled "Rate of Carbon Elimination and Degree of Oxidation of the Metal Bath in Basic Open - Hearth Practice." Practical experience has led to the generally accepted belief that the use of slags relatively high in iron oxide, such as are required to bring about rapid refining, leads to a certain sacrifice of quality in the product. As a consequence, a compromise must be made between the exceedingly slow rate of carbon drop which would correspond to the ideal case and the rapid rate which would best satisfy the condition of minimum cost.

An increase in rate of refining necessarily implies an increase in the concentration of iron oxide

dissolved in the metal. However, even for the infinitely slow rate that corresponds to slag-metal equilibrium, the metal would contain a certain definite concentration of dissolved iron oxide. It is a matter of great practical importance, therefore, to determine the quantitative relation between the minimum or equilibrium concentration of iron oxide in the metal and the higher concentrations which must actually obtain in practice.

The slag comprises the immediate oxidizing agent. It is, for practical purposes, insoluble in molten iron and actual removal of the oxidizable elements from the latter must be accomplished by diffusion or transfer of iron oxide from the slag to the metal across the slag-metal interface. Since FeO is soluble in molten iron and since Fe_2O_3 is converted into FeO upon coming into contact with molten iron, the above-mentioned transfer from slag to metal is a transfer of FeO alone.

Oxidation of carbon proceeds by virtue of the reaction

$$C + FeO = CO + Fe.$$

The dissolved CO, a product of the above reaction, saturates the metal and thereafter escapes as gaseous CO at a pressure equal to the mean or effective hydrostatic pressure. Unless outward diffusion of CO is considered to be too slow to be of practical importance, there can be no such thing as equilibrium between carbon and FeO in the metal bath, excepting the hypothetical equilibrium at extremely low CO pressures, where dissolved CO would by thermal dissociation be in equilibrium with the oxygen pressure of dissociated FeO at the slag-metal interface.

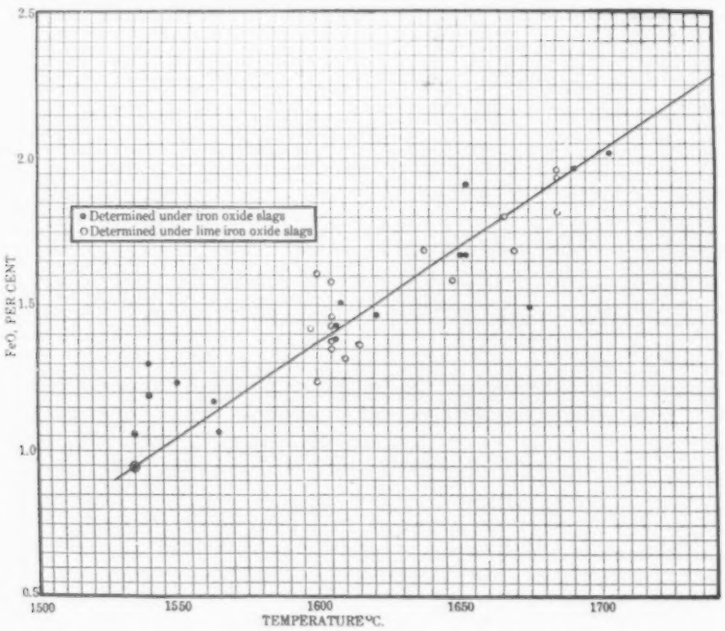
When carbon elimination ceases measurably to progress, the carbon and FeO dissolved in the metal are substantially in equilibrium with CO at a pressure of 1 atmosphere. Hence, for any given temperature, the product of carbon and FeO is equal to a constant—the equilibrium constant for the above-mentioned reaction.

Diffusion Equations Developed

Equations which express the relation between rate of carbon drop, FeO content of the metal, and various other factors have been developed.

Assuming that the data used in the calculation are accurate enough for practical purposes, it becomes possible to calculate how the FeO content of the metal varies with rate of carbon drop for the particular operating temperature. The proportional increase in FeO due to rate of carbon drop, over and above the equilibrium value, is an inverse measure of the degree to which furnace practice approaches the ideal.

The first conclusion is that there is no conflict between theory and practice, and that the commonly accepted beliefs and ideas, so far as they go, contain the germ of truth, in most cases at least. However, the next conclusion, which inevitably follows from a careful consideration of the complexity of the physico-chemical process which comprises basic open-hearth refining, is that it can be only through the application of a perfectly elaborated theory of the process, confirmed by and based upon accurate experimental measurements, that the metallurgical and economic factors involved will be brought within intelligent understanding. The ability of a science to predict quantitatively is a measure of its degree of perfection, and prediction requires an adequate theory and the necessary fundamental data.



Effect of Temperature on Solubility of FeO in Iron

Solubility of Iron Oxide

Iron oxide (FeO) plays an extremely important part in the manufacture of steel, according to C. H. Herty, Jr., and J. M. Gaines, Jr., physical chemist and assistant physical chemist, respectively, Pittsburgh Experiment Station, United States Bureau of Mines, in a paper entitled "Effect of Temperature on the Solubility of Iron Oxide in Iron." In the open-hearth furnace and the Bessemer converter it is the chemically predominant compound and controls to a large extent both the operation of the furnaces and the composition and quality of their products. Almost all of the refining action is carried out through the medium of FeO, which oxidizes carbon, manganese, silicon and phosphorus.

At the end of any open-hearth or Bessemer heat the steel contains dissolved iron oxide, which must be wholly or partly eliminated. The type of deoxidation product depends on the amount of dissolved iron oxide and on the deoxidizer used. After the heat has been deoxidized and while it is being teemed, iron oxide diffuses from the ladle slag into the metal, causing losses of deoxidizer and increase in iron oxide content of the steel.

It is generally believed that non-metallic inclusions are responsible for a great many failures of steel in service and for decreased yield of steel during rolling. The basis of most non-metallic inclusions is dissolved iron oxide. This investigation was undertaken to determine the amount of iron oxide that will dissolve in iron under various conditions. Steel-making slags are complex and it has been thought best to determine solubility under simple slags as a first step. The study is being continued under slags whose compositions approach those of operating slags.

Experimental Method

In making determinations on the solubility of iron oxide in iron, a 50-kw. Ajax-Northrup furnace was used. This was equipped with a magnesia-lined graphite crucible in which 50 lb. of electrolytic iron was melted and held at the required temperature. When the metal was melted, the desired slag—either iron oxide or a mixture of lime and iron oxide—was added in sufficient quantity to give a liquid ring on the surface of the metal. Temperature readings were taken at frequent intervals and when the temperature had been constant for 15 min., samples of slag and metal were taken. The slag was analyzed by the usual laboratory methods for FeO, Fe_2O_3, SiO_2, MgO and CaO. One or two samples of metal from each heat were analyzed for the usual constituents, carbon, manganese, phosphorus, etc., and all samples were run by the modified Ledebur method for oxygen content.

The fact that increasing amounts of oxygen are found in the metal with increasing temperature indicates that oxygen dissolved in the metal is present as a compound and not as a gas. Gas

dissolved in liquids shows decreasing solubility with increasing temperature.

Solubility of FeO in Iron Under Operating Slags

The exact amount of FeO in the metal in equilibrium with a finishing open-hearth or Bessemer slag cannot be predicted until data are obtained on the compounds present in such slags. The initial steps toward a knowledge of solubility of FeO in iron under commercial slags are determinations of solubility under slags consisting of FeO and SiO_2, and FeO, CaO and SiO_2.

Furthermore, in open-hearth operation, equilibrium between slag and metal is seldom reached, because carbon elimination is proceeding at all times, preventing the metal from taking up iron oxide to its equilibrium value. Under open-hearth conditions the amount of dissolved iron oxide depends on the carbon content of the metal and the temperature, unless, of course, deoxidation with some other metalloid has taken place.

The rate at which carbon is eliminated is controlled primarily by the rate of diffusion of iron oxide from the slag into the metal and this to a large extent depends on the saturation value of FeO in the metal under the slag in question.

Discussion

Running discussion followed the presentation of the three papers on open-hearth subjects. Among the principal points brought out were the following:

Slag analyses to determine FeO are available to the practical open-hearth man and can be reported by the laboratory sooner than the carbon determination comes back. If these samples are taken an hour before tapping they will be a great help in controlling the ore additions and finishing the heat.

Dissolved FeO in the bath affects the rate of carbon drop. In contrast, however, inclusions of iron silicates have no effect upon the rate of carbon drop.

A suggestion was made for obtaining the temperature of the bath of metal by means other than those depending largely upon the consideration of the temperature of the slag. This involves the use of a definite weight of platinum, which would be immersed in the bath in a refractory receptable and held there long enough to acquire the bath temperature. It then would be put into a mercury calorimeter and an accurate determination of the bath temperature would thus become available. It was hinted that a thermocouple for this purpose is now in process of experimentation in a prominent laboratory, and that announcement may be expected shortly as to its characteristics and utility.

Deep baths require a higher percentage of FeO in the slag than do shallow baths, to give an equivalent removal of carbon from the bath by the ordinary reaction $FeO + C = CO + Fe$. This is due to the fact that, with equal FeO in the slag, the rate of removal is about proportional to the area of the contact plane between slag and bath. With a deep bath (and more tons of it) there is a larger amount of carbon to be removed from the bath than with a shallow bath of equal plane.

Some Steels Used by Railroads

MEETINGS considering the properties of various steels were held on Monday, Feb. 20. The morning was given over to the more scientific aspects of alloy systems and results of laboratory study. During the afternoon several papers on the utility of steels were read, and the Howe Memorial Lecture was delivered by Henry D. Hibbard.

Rail Steel Made in Germany

More discussion was accorded C. W. Gennet's paper on "The Manufacture of Some Foreign Rails" than any other. This has already been printed in full abstract in THE IRON AGE, Feb. 9, page 405.

C. B. Bronson of the New York Central Lines dwelt chiefly on the comparative value of the roller straightener and the gag press. He said there were six debatable points, of which the first is most important: (1) Does the roller straightener, in severely kneading the entire rail end to end, do less damage than a few separate blows by the gag press? (2) Will the more costly roller straightener do the work cheaper? On this point he recognized that the tendency toward longer and heavier rails (two-thirds of them now weigh more than 100 lb. per yard) is making the straightener's and helper's job very exhausting. (3) Will it require expensive changes in layout at the finishing end of the rail mill? (4) Can it handle satisfactorily all reasonable variations in line and surface in the rails from the hot bed? (5) Can a second handling at a gag press to remove kinks at the very end be avoided? (6) Does roller straightening iron out and cover up surface defects?

George F. Comstock, consulting metallurgical engineer, Niagara Falls, N. Y., was of the opinion that the reduced piping observed in the Krupp rails was due to the slow rate of pouring a group of ingots rather than the fact that they were bottom cast. Segregation is a more important defect than piping, and unfortunately the available data are insufficient to determine whether the foreign rails are any better in this respect than American rails. He suggested that the method of making the drop test may not have revealed the true story as to segregation.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., described the mechanism whereby slow bottom pour reduced the pipe even

THREE Metallurgists on Whom Awards Were Bestowed at the Banquet. Mr. Blaylock, the James Douglas medal; Doctor Mathews, the Hunt medal and Doctor Herty, the Hunt prize

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C. H. HERTY, JR.

though the mold were small end up. The metal, being in the bottom of the mold for a much longer time, chills a thick wall. At the end of the pour this chill is progressively thinner toward the top, thus inclosing a liquid core which has a greater cross section at the top than lower down—in effect a big-end-up condition.

George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., emphasized the fact that the raw material used for these rails was very carefully selected low-phosphorus scrap and pig, thus enabling carbon to be caught on the way down. He inspected the rails on delivery and found them to be remarkably straight. After 18 months in the track, they appear to be in as good shape as the average American rails after similar service.

Railroad Steels Are Meeting More Severe Duty

Robert Job, vice-president Milton Hershey Co., Ltd., Montreal, Canada, discussed "Types of Steel Used by Railroads, Past and Present." His general remarks on the development of axles and forgings were on ground already covered by E. J. Edwards in "Steels for Locomotive Forgings," printed in THE IRON AGE, Jan. 26, page 255. Discussing boilers, he noted the abandonment of wrought iron for carbon steels, and more lately a mis-named "silicon steel," and nickel steels. The relative advantages of these stronger steels is a matter which only extended experience in service can determine. Typical analyses are given in the table.

Properties of Boiler Steels

	Carbon Steel	"Silicon Steel"	Annealed Nickel Steel(a)
Chemical Analysis:			
Carbon, per cent	0.20	0.28(b)	0.16
Manganese, per cent	0.40	0.80(b)	0.56
Silicon, per cent	0.20	0.21	0.20
Phosphorus, per cent	0.02	0.03	0.02
Sulphur, per cent	0.03	0.03	0.03
Nickel, per cent	...	...	3.0
Physical Properties:			
Ultimate strength, lb. per sq. in.	60,000	80,000	78,000
Yield point, lb. per sq. in.	35,000	48,500	47,500
Elongation in 8 in., per cent	29.0	26.0	26.0
Reduction in area, per cent	...	49.0	54.0

(a) Average of 385 tests. See THE IRON AGE, Feb. 23, p. 537.
(b) Obviously the enhanced properties are due not to silicon but to increased carbon and manganese.

Locomotive frames have been discussed by W. A. Newman and C. F. Pascoe in THE IRON AGE, March 10, 1927, and alloy steel staybolts on Dec. 29, 1927, page 1785. Steel staybolts are practically standard for Canadian railroads. Locomotive tires have also been improved; the following are indicative of the requirements of Canadian roads: ultimate strength 150,000; minimum yield point 85,000 lb. per sq. in.; elongation 2 in., 10 per cent, reduction in area, 20 per cent, Brinell hardness 245 minimum. In order to get such physicals in a plain steel having both carbon and manganese between 0.67 to 0.77, heat treatment at the discretion of the manufacturer is necessary. Competition of forged steel wheels, and cast wheels with steel tires, has forced the makers of chilled iron wheels to study and improve their product. As a result a much better average wheel is now in use. The principal defect of the forged steel wheel is that when the hardened surface of the rim is worn through, further wear is rapid. Deeper hardening is difficult on account of the mass of the tread.

Blast Furnace Practice and Quality of Iron Castings

ONE afternoon session was devoted to a joint round-table conference on blast furnace operations and the character of pig iron and castings. Those partaking in the conference, which was held under the auspices of the iron and steel committee of the institute, were representatives of the American Foundrymen's Association, the American Pig Iron Association, the American Society for Testing Materials, the United States Bureau of Mines, the United States Bureau of Standards and various large pig iron consumers.

The conference last week was really a continuation of two previous conferences of a similar nature held a year ago by the mining engineers and reported in THE IRON AGE, Feb. 24, 1927, and another one under the auspices of the American Foundrymen's Association held in Chicago last June and reviewed in THE IRON AGE, June 16, 1927. At the latter conference a resolution was passed to the effect that a cooperative study of the effects of varying blast furnace operations on the character of pig iron made under changing blast furnace conditions and on the castings made therefrom be conducted under the supervision of the Department of Commerce, with an advisory committee consisting of representatives of the national technical associations.

The object of the conference this year was further to consider the situation and the conditions surrounding such a possible investigation and to come to some conclusion, if possible. In the absence of R. H. Sweetser, who was chairman of the Chicago conference and who was to have been chairman of the meeting last week but was unable to be present because of illness, Dr. Richard Moldenke conducted the meeting. Among those who took part in the general discussion of the subject, including the chairman, were Hyman Bornstein, Deere & Co., Moline, Ill., representing the committee on gray iron of the foundrymen's association; J. T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., representing the American Society for Testing Materials; Dr. C. H. Herty, Jr., United States Bureau of Mines, Pittsburgh; Dr. H. W. Gillett of the United States Bureau of Standards; J. A. Capp, engineer of tests General Electric Co., Schenectady, N. Y.; J. W. Bolton, chief metallurgist Lunkenheimer Co., Cincinnati; A. L. Feild, Union Carbide and Carbon Research Department, New York; and R. E. Kennedy, technical secretary of the foundrymen's association.

It was evident from the general discussion that there is no agreement as to just what constitutes bad castings, nor as to just what the real cause is of the various troubles which have been complained of. It was the general opinion that no progress can be made in an investigation, nor can any investigation be justified, until facts are established as to just what constitutes bad iron. One commentator was convinced that the proper way to approach the subject was from the foundry end and not from the blast furnace end, and another stated that until we try to establish the really useful, as well as the bad, properties, and then have some means of measuring them, we cannot get very far.

The committee on gray iron of the American Foundrymen's Association held a meeting previous to the round-table conference, and after a thorough discussion of the whole subject adopted the following statement, which was presented by R. E. Kennedy, technical secretary of the association, as an expression of the committee's opinion:

> The gray iron foundry industry is confronted with many difficulties owing to the complexity of its products. Not the least of these difficulties is the lack of definition of the difficulties themselves. The A. F. A. committee, having come to the realization of the necessity for definition of the various elements of the problem, has reached the conclusion that progress may be expected only after these definitions have been arrived at. Therefore, the committee proposes to attempt the formulation of a series of specific problems, the answers to which will at least assist in the establish-

ment of means of measuring qualities which determine the usefulness of the product, cast iron. When these means of measuring qualities have been determined, there is the immediate opportunity to determine the influence of variables in raw material and practice upon the output. We have every confidence that when the problem has been thus defined there will be found the active sympathetic cooperation among the interests involved in the prosecution of the research.

The round-table discussion was brought to a close by the adoption of a motion that the matter be referred to the committee on gray iron of the A. F. A. and that Dr. C. H. Herty, Jr., of the Bureau of Mines, Dr. H. W. Gillett of the Bureau of Standards, and Ralph H. Sweetser of the mining engineers cooperate and work with this committee to formulate some definite suggestions as to the advisability and scope of research in this field.

Secretary Hoover Signally Honored—Other Awards

HIGH tribute to Secretary Hoover was the feature of the annual banquet, which was held Tuesday evening. The dinner was the largest one ever held by the institute, and the 1100 guests taxed the capacity of the Waldorf-Astoria banquet hall.

To Herbert Hoover, Secretary of Commerce and a past-president of the institute, the second award of the Saunders medal for achievement in mining was the occasion of a demonstration which will long be remembered by the recipient and by those present. The formal speech of presentation was made by Cornelius F. Kelley, president Anaconda Copper Mining Co., New York. Referring to Mr. Hoover's work for refugees in the World War as "the greatest self-imposed task undertaken in the history of mankind and successfully accomplished," Mr. Kelley declared that both in war and in peace "the name of Hoover has become a synonym of helpful, intelligent, instructive, unselfish service."

Mr. Hoover's brief speech of acceptance was a review of the great advance in the engineering profession during the last 40 years, and a tribute to the work of American engineers, past, present and future. "The exchange of engineering experience and scientific discovery between nations," said Mr. Hoover, "is one form of internationalism that is beyond any reservation. More and more engineers are administrators of great industries, instead of being responsible solely for the application of their technology. A greater America for our children will in large degree depend upon the engineering profession."

For achievement in non-ferrous metallurgy the James Douglas medal is awarded each year and the occasion this year was the seventh presentation. The recipient was Selwyn G. Blaylock, general manager Consolidated Mining & Smelting Co. of Canada, Trail, B. C., Canada. The medal was presented by Scott Turner, director of the United States Bureau of Mines, who emphasized many points in Mr. Blaylock's career, particularly his acquisition of the Sullivan mine for his company and the development of the large refining plant at Trail.

For achievement in ferrous metallurgy the Robert W. Hunt medal this year was conferred upon Dr. John A. Mathews, vice-president Crucible Steel Co. of America. The award was presented by J. V. W. Reynders, a past-president of the institute, and was in recognition of Dr. Mathews' Howe lecture on "Austenitic Steels" last year.

For distinguished work in ferrous metallurgy the Hunt prize was awarded to Dr. C. H. Herty, Jr., of the United States Bureau of Mines, and for distinguished work on blast furnace problems the J. E. Johnson, Jr. award was made to P. H. Royster of the Fixed Nitrogen Research Laboratory, Washington. The award to Doctor Herty was based on his papers on the physical chemistry of steel making.

The post-prandial program was brought to a close by the introduction of the new president, George Otis Smith, director United States Geological Survey, who graciously presented his greetings to the members in assuming his new office.

Iron and Steel Committee's New Officers

The iron and steel committee of the institute, at its usual luncheon, adopted a resolution recommending to the board of directors of the institute that the iron and steel activities of the organization be recognized by establishing an iron and steel division similar to that of the institute of metals division instead of the present arrangement confined to the work of a single committee.

New officers for the coming year were elected as follows: Ralph A. Sweetser, American Rolling Mill Co., Columbus, Ohio, was made chairman. Dr. F. C. Langenberg, vice-president Climax Molybdenum Co., New York, and W. J. Priestley, vice-president Electro Metallurgical Sales Corporation, were named as vice-chairmen. Mr. Sweetser had been a vice-chairman for some time and has been very active in the work of the committee in the last few years.

New Officers

AT the annual meeting of the institute, George Otis Smith, director United States Geological Survey, Washington, was elected president. Two vice-presidents were elected, namely, George D. Barron, consulting engineer, New York, and William H. Basset, American Brass Co., Waterbury, Conn. As new directors, Herman C. Bellinger, vice-president Chile Exploration Co., New York; H. G. Moulton, consulting mining engineer, New York, and Robert E. Tally, general manager United Verde Copper Co., Jerome, Ariz., were named.

As president of the women's auxiliary of the institute, Mrs. Herbert Hoover was unanimously elected.

Merger with the Rocky Mountain Club

An important decision was reached in the consummation of the merger of the Rocky Mountain Club of New York with the institute. This club, which was started in 1907 and which at one time was an active and prominent organization, with John Hayes Hammond as its president, during the war accumulated a fund of about $115,000 with which to build a club house. This project was never brought to a head. Those interested both in the club and in the institute were convinced that, if a merger of the two could be achieved, mutual benefit would result. A way was found by which this could be consummated and the final steps in the proceeding were taken last week. Members of the Rocky Mountain Club, who are not members of the institute, will automatically become members and the fund accumulated by the club will add decidedly to the resources of mining engineers.

Other Events

An abstract of the Howe memorial lecture and an account of the meetings of the Institute of Metals division will be published next week.

Henry D. Hibbard, who delivered the memorial lecture, is a consulting engineer, Plainfield, N. J., who has written frequently for THE IRON AGE. His subject was "Significance of the Simple Steel Analysis."

The Institute of Metals Division of the institute held a very successful series of technical sessions. The annual lecture was delivered by Dr. C. H. Mathewson, professor of metallurgy, Yale University, New Haven, Conn., on the subject "Significance of the Twinned Structure in Wrought Metals." The attendance at the sessions and the lecture was large. The usual dinner was held at the University Club on Wednesday.

Powdered Coal for Malleable Iron

Advantages Reported Are Numerous—Better Control, Lower Costs, More Uniform Operation and Quality, Quicker Heat and Hotter Metal

ALL five plants of the Eastern Malleable Iron Co. were changed over from hand-fired operation within a period of 12 months to the use of powdered coal as a fuel for air furnaces. Previously raw coal was used, shoveled in by hand labor and accompanied with the usual amount of smudge and noxious gases. The first pulverized coal unit was placed in operation on Oct. 19, 1925, in the plant at Naugatuck, Conn., and the last unit was in a year later.

Briefly stated, the advantages which are reported include getting away from the fumes and smoke previously encountered, a more uniform heating operation resulting in some quickening of the heat, a saving in furnace labor costs, a slight saving in refractory costs not yet completely evaluated and ability to run heats on a more definite schedule. The gain in refractories comes mainly from the fact that the furnace fire box and front bridge wall are now no longer needed. Whether there is an accompanying gain in increased life of refractories along the side walls and bungs is not yet definitely determined. There is less cutting along the slag line. Taken altogether, these advantages record considerable improvement over what was previously possible.

An incidental gain comes from the character of the coal used. This now consists of what is known as ¾-in. slack gas coal, which is cheaper than the ¾-in. lump gas coal previously employed. The coal handling is done mechanically, coal being brought in from storage in buckets holding 1 cu. yd. and carried on trailers hauled by a tractor. These buckets are dumped into a 6-ton hopper above the pulverizer by use of a crane.

First to Dispense With a Drier

The first unit installed at Naugatuck is said to be the second case of unit pulverizing of coal for this purpose, and the first successful case where the operation dispenses with the use of a drier for the coal. Coal is stored both indoors and outdoors, the outdoor storage having no roof. In a stretch of dry weather coal is taken from the outdoor storage and put through the process without any treatment whatever. In wet weather, or when there is snow, coal from the indoor storage is used.

Coal is fed through the bottom of the hopper by means of an adjustable gate upon a short horizontal belt which operates at a predetermined speed. This belt runs over a magnetized pulley, which gets rid of most of the "tramp iron" which may come in with the coal. From the belt the coal drops through a short diagonal chute to a rapidly revolving plate in the pulverizer proper.

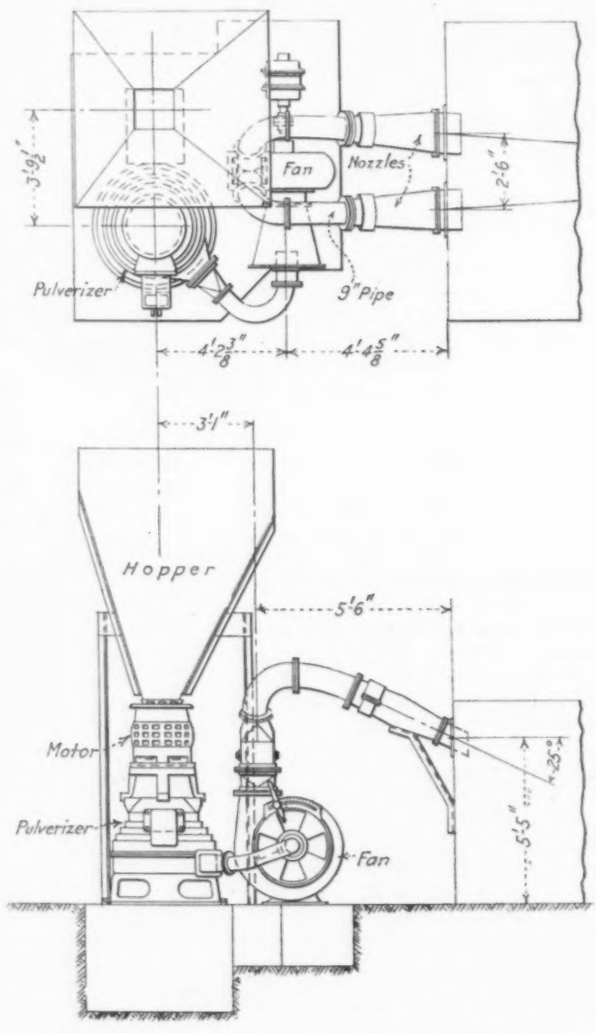
Centrifugal force throws the coal to the periphery of the plate, whence it is cascaded down through a series of pulverizing elements consisting of beaters or hammers fastened on sets of plates. These crush the coal against an inner corrugated lining of the pulverizer housing. Successive lower stages, there being five steps, are of greater diameter as the coal drops lower and gets finer. As high as 75 per cent of the coal thus pulverized will pass through a 200-mesh sieve.

Putting the Coal Into the Furnace

This coal, forced under the pressure of a fan through two burners opening into the furnace, takes the place of the former raw coal, burned on a grate with a form of stoker arrangement for spreading the coal over the grate. One man operates the furnace, having a helper only at time of tapping, in place of the previous two to three men, working much harder and engaged mainly in shoveling coal.

The two jets of flame from the burners are so directed that their center lines converge about 15 ft. inside the furnace. They are directed downward, however, so that the flame actually hits the bath at about half this distance. This bath measures 32 ft. in length in this furnace rated at 25 tons, while the width is from 6½ to 7 ft. The depth of bath when fully melted is about 9 in. at the lower tap hole (nearest the burners) and 3 in. at the farther end.

Charges of sprue, runners and risers (50 to 60 per cent) and pig iron, malleable and steel scrap (40 to 50 per cent) fill the furnace to the roof. One advantage of having the flame directed downward into the charge



Elevation and Plan of the Unit Pulverizer and Burner Equipment. The feeding gate from hopper to pulverizer is adjustable. The air supply to the fan is adjustable, also, and is worked on a definite schedule throughout the period of a heat, as determined by experiment and experience

lies in the fact that this forces the flame through the charge and thoroughly heats it before melting begins. The upper parts then gradually sink into the molten pool below. Thus, molten metal does not run down over relatively cold material and partially solidify again.

Coal is blown into the furnace by a fan operated by a 15-hp. motor. This fan provides suction from the pulverizer and at the same time forced draft for the furnace. The motor operating the pulverizer proper is of 40 hp. All of the equipment, from hopper to

General View of the Whole Installation, from Coal Hopper (Bottom Shown) to Stack. The adjustable coal feeding gate appears at bottom of hopper; adjustable air inlet below where the two burners enter the furnace. Pulverizer is in left foreground and blower or fan just back of air inlet

burner, is from the designs of the Grindle Fuel Equipment Co. (subsidiary of Whiting Corporation), Harvey, Ill. Except for the hopper, beaters, motors, fan and magnetic separator, all this equipment was made by the Grindle company.

As much of the work of this plant consists of small castings, many no larger than a man's finger, it is necessary to pour the iron at a high temperature. It is almost always above 2800 deg. Fahr. This requirement of high temperature makes it inexpedient to use a bull ladle. Hence all the iron is drawn off in hand ladles and carried quickly to the pouring floors. These floors are located on both sides of the furnace.

Incidental Advantages Noted

Safety is reported as an important feature of the system. If either motor stops, the interconnecting electric equipment stops the other. This means that there is no storage whatever of pulverized coal anywhere in the system. As pulverized coal is naturally explosive, the importance of this factor will be realized. When closing down the furnace, the operator shuts off the coal first. The blast of air continues for a few minutes longer, thus cleaning out of the system any coal particles which may have lodged in it. When the air goes off, the pipes are entirely empty.

Maintenance is reported as not a serious problem thus far. This covers both the coal preparation plant and the furnace. The beater sections are arranged so that they can be operated in one direction one week and in the opposite direction the next week, thus equalizing wear. Extra corrugated liners, beaters and the plates over which the coal passes are carried in stock. Thus it is easy to handle any repair or adjustment which may be necessary during the time the furnace is not operating. There is only one heat taken each day, and the repair gang can get into the furnace if necessary in the morning, before the heat is started. Or it can work on the pulverizer after a heat is out.

In construction the furnace rests on a concrete slab which supports the furnace walls and sand bottom. The top layer of sand, to a depth of 8 or 10 in., is a highly refractory variety. The surface of the bottom after the first heat is so hard that it will withstand the ordinary bumping it receives when the charge is dumped upon it. Fire clay brick of the highest quality is required for the side walls and bungs. Silica brick would not do, because of its tendency to spall under the alternate heating and cooling of the furnace.

What the new operating method means in lowered unit cost of castings was not disclosed. Many of the items of savings are not readily measurable—the more definite operating schedule and the elimination of sooty smoke, for example. But the effect upon morale is not the least of the benefits which have been noted. Working conditions have been improved not only for those having charge of the furnace but for the much larger number of molders in its vicinity. And the direct savings, which can be measured, have no uncertain bearing upon the high utility of the methods employed.

To Install Foundry Handling Equipment without Shut-Down

Stephens-Adamson Mfg. Co., Aurora, Ill., is designing and furnishing a new installation of conveying and sand-handling equipment for the Melrose Park plant of the American Brake Shoe & Foundry Co., Chicago. The equipment will include a long roller conveyor, upon which continuous molding, pouring, cooling and shaking out will take place. The installation will include also apron and belt conveyors to sand-preparing machinery, screens, mixers, aerator, bucket elevator, distributing conveyor to overhead storage bins and feeders to molding machines. The new machinery is to be installed without interfering with regular foundry production.

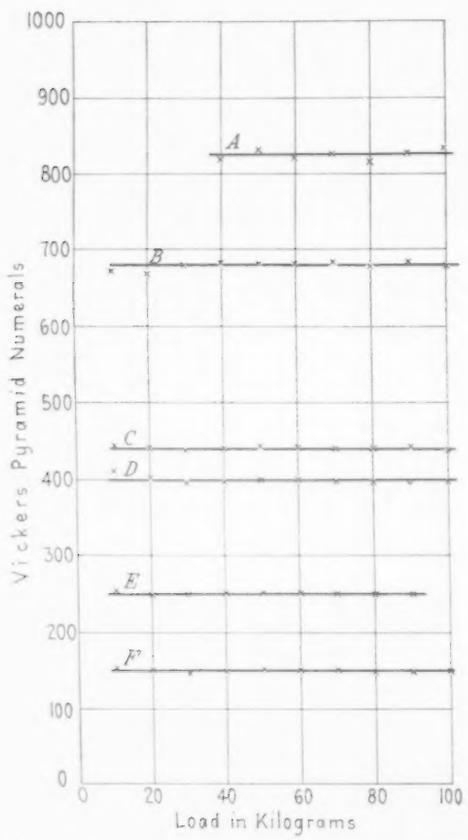
The Federal Compress & Warehouse Co., Memphis, Tenn., has filed a motion with the Interstate Commerce Commission asking the inclusion of castings and forgings and parts of compresses, each piece weighing 2000 lb. or over, in the iron and steel list in the Consolidated Southwestern Cases. The motion points out that the railroads propose to give castings and forgings Class A rating instead of a commodity rating, and that the effect would be to increase rates on these products from 46 to 64 per cent.

Loading of revenue freight for the week ended Feb. 4 totaled 926,204 cars, according to reports by the Car Service Division, American Railway Association. This was an increase of 23,372 cars over the preceding week, but a decrease of 39,460 cars under the same week in 1927.

An Improved Hardness Tester

Accurate and Proportional Brinell Numerals Claimed for British Machine—Diamond Pyramid Used as the Indenter

A NOVEL testing machine, developed by Vickers, Ltd., Erith, England, was exhibited at the Detroit exposition of the American Society for Steel Treating. It utilizes the Brinell principle, but with a diamond indenter pressed into the work under low load and at an automatically controlled rate. Thus it is said to be superior for metals of great hardness,



Hardness Tests on Various Metals Using Different Loads on Pyramid

A: 0.6 per cent carbon steel, water hardened
B: High-speed steel, hardened 1280 deg. C., tempered 630 deg. C.
C: 0.6 per cent carbon steel, oil hardened, tempered 450 deg. C.
D: Hadfield's manganese steel
E: 0.6 per cent carbon steel, oil hardened, tempered 650 deg. C.
F: 0.25 per cent carbon steel, oil hardened, tempered 700 deg. C.

and to be applicable to finished work and very thin sheets.

The indenter is a diamond accurately cut and polished to the form of a square-based pyramid. The impressions are therefore square. The load is light, varying from 10 to 50 kg., according to requirements; the hardness numerals obtained by the new apparatus are corrected Brinell numerals, which are strictly proportional whether the material tested is lead or the hardest steel.

The diamond pyramid was adopted in preference to the steel ball or steel cone for the following reasons:

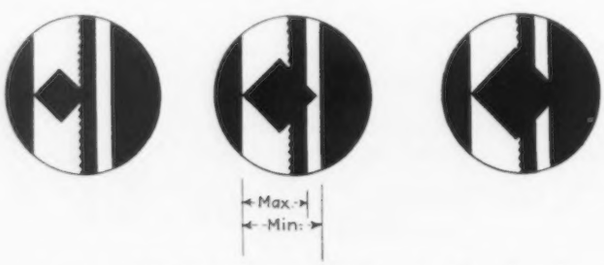
1. The square surface impression is well defined and can be measured with accuracy across the diagonal corners.
2. The impressions are always geometrically similar, irrespective of size.
3. The deformation of the indenter is practically zero, owing to its enormous hardness, even when compared with the hardest of steels.

The diagram shows how the hardness numerals obtained with a diamond pyramid at various loads on several different homogeneous materials are unaffected by variation in load. In full appreciation of the popularity of the Brinell test, the angularity of the Vickers

View of Indentation as It Appears Through Measuring Microscope, Illustrating Precision with Which Knife Edges Can Gage the Size

pyramid is based on that of a ball impression of the ideal size, i.e. 0.375 times the diameter of the ball. This angle is 136 deg. It has been found, from a very large number of tests, that the numerals obtained are identical to those resulting from the ball test when the load on the Brinell machine has been adjusted to produce an impression which is 0.375 times the diameter of the ball. This similarity in hardness numerals obtains, however, only in the lower regions of hardness—that is, where the steel ball does not undergo any appreciable deformation. Between 500 and 600 Brinell hardness this deformation begins to make itself manifest by yielding slightly lower readings than the diamond pyramid, and this tendency, of course, increases with increasing hardness, until it becomes very pronounced. It should also be noted that unavoidable differences in the hardness of different steel balls will affect the numerals obtained, particularly in the higher regions.

The machine designed for use with this indenter is illustrated in the drawing and photograph. A main



Setting of Knife Edges in Micrometer Eyepiece for Checking Maximum and Minimum Hardness. Left is impression on material which is too hard, right on too soft, and center on material which falls within the specification

frame *A* of U section, carries the stage *B* and a simple lever *C* of 20 to 1 ratio, which applies the load through a thrust rod *D* to a tube *E*, which is free to reciprocate vertically and carries the indenter *F* at its lower end.

Attached to the main frame is a smaller frame *G*, which contains all the control mechanism. The plunger *H* reciprocates vertically under the influence of a rotating cam *J*, its purpose being to apply and remove the test load. The cam is mounted on drum *K* and the whole is rotated by a weight *L* attached to a flexible wire, after the starting handle *M* has been depressed. The speed of rotation is controlled by an oil dash pot *N*

and is regulated by an adjustable control valve. The plunger *H* carries a rubber pad at its upper end, which engages with a cone mounted in the beam, thereby insuring a very slow and diminishing rate of application of the last part of the load. Since the cam both lowers and raises the plunger in the course of its movement, it will be seen that uniformity of loading and duration of load is attained, errors due to inertia or premature removal of the load being eliminated.

Depression of the foot pedal *P* returns cam, drum and weight to their original positions. A tripping piece *R* supports the beam during this latter operation, and drops out as soon as the plunger *H* returns to its top position.

The measuring microscope is capable of measuring to 0.001 mm. As shown in the photograph, it is mounted on a hinged bracket, arranged so it may be swung to a position immediately over the impression. It follows, therefore, that it is only necessary to lower the main stage *B* by the handwheel (upon which rests the operator's hand) and swing the microscope around. The operator leans slightly forward and makes the observation. A considerable saving of time is thereby effected. The impression is illuminated by a vertical beam of light obtained from a lamp, condenser and vertical illuminator, all of which are mounted on the microscope. The light is switched off automatically in swinging the microscope out of position.

Instead of the usual scale or eye-piece micrometer, a specially designed micrometer ocular is provided. The impressions are read to knife edges, thus avoiding eyestrain, and readings are taken from a digit counter, mounted on the side of the ocular.

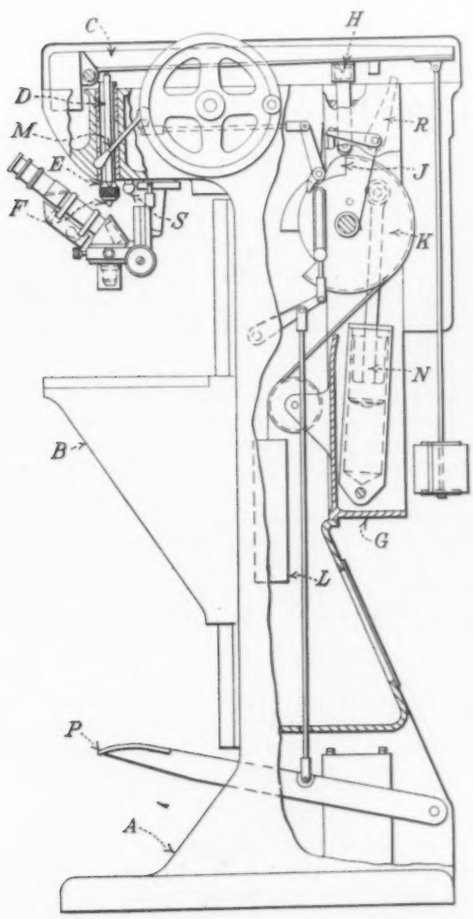
In order to make a test, the foot pedal is first depressed and the microscope swung out of position. The area to be tested should be smooth and clean. The work having been placed on the stage, the latter is raised until the surface to be tested just clears the point of the diamond. The small lamp *S* may be switched on if necessary to facilitate this adjustment. The starting handle *M* is then pressed to release the mechanism, when the test proceeds automatically and terminates with a click. If, for any reason, the work has not been elevated to clear the diamond within reasonable limits, the test cannot proceed satisfactorily, and in order to warn the operator of these conditions a small buzzer comes into operation.

After the test has been properly completed the stage is lowered and the microscope swung over. In focussing the impression, coarse adjustment is obtained by movement of the stage, the fine adjustment being provided on the microscope itself. The measurements are made across the diagonal corners of the square impression. One of the knife edges in the eyepiece is fixed and is set by means of centering screws at the left hand corner of the impression, as it appears through the microscope. A second knife edge controlled by a micrometer screw and geared to the digit indicator is then adjusted to correspond with the right-hand corner of the impression. The reading is taken from the digit indicator at the side of the eyepiece and converted, by means of a table for the particular load impressed, direct to Brinell hardness numerals.

Digit Indicator on Eyepiece to Give Measured Distance Across Impression

Where the work has to fall within specified maximum and minimum limits of hardness, a third knife edge is brought into use. This third knife edge is set to correspond with the smaller dimension, i.e., the maximum limit of hardness, the micrometer knife edge then being adjusted to correspond with the larger dimension, i.e., the minimum limit of hardness. It is only necessary when reading to set the fixed knife edge to the left-hand corner of the impression in the ordinary way, and the right-hand corner must fall within the open strip representing the tolerance.

The time taken in the application and duration of the load can be adjusted by the oil control valve of the dashpot within wide limits. For purposes of research work it is generally desirable to set the valve so that this period is 30 sec., but for most practical purposes a 10-sec. setting will be found satisfactory. It is said that accurate tests have been made at a speed of 200 per hour.



Operator Raising Main Stage, Preparatory to Testing Hardness of Hob; Measuring Microscope Swung Aside

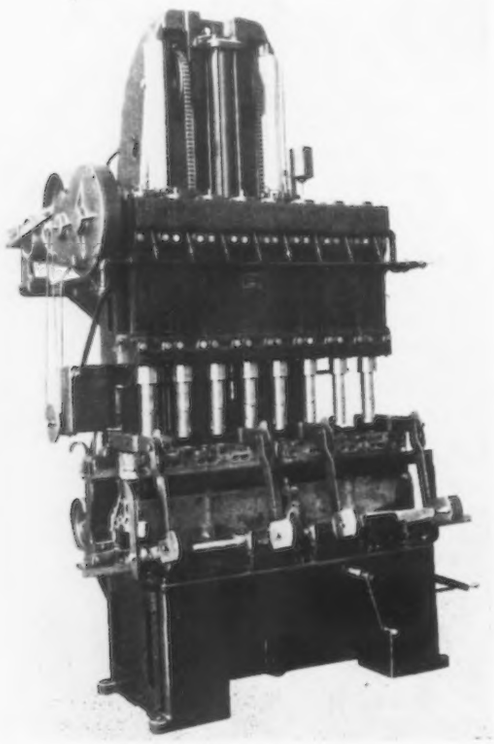
(*At Left*) *Sectional Diagram of Mechanism*

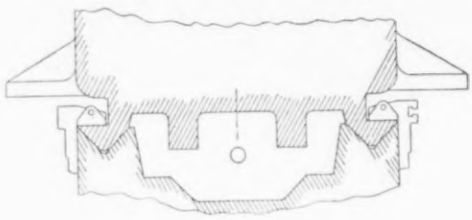
CYLINDER BORING MACHINES

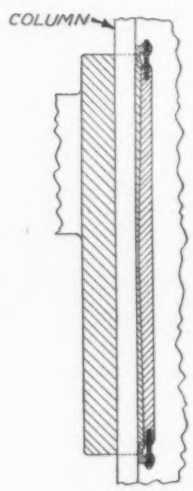
Hydraulic Feed and Double-V Guides Are Features of Redesigned Line of Equipment

THE Moline Tool Co., Moline, Ill., has redesigned its line of multiple-spindle cylinder boring machines, two sizes of which are designated as the No. 13 and No. 10-D respectively.

Both machines have hydraulic feed, using Oilgear equipment, and employ double-V guides, the arrangement of the latter being shown in the accompanying illustrations. Mounting of the hydraulic feed cylinder, between the two guides, is emphasized as eliminating the possibility of weaving of the slide during a heavy cut. The slide is held securely against the V-guides by four taper gibs, as shown in the second sectional view. The latter feature, which is claimed to be new in machine tool construction, is emphasized as facilitating adjustment. Anti-friction bearings are used on all drive shafts.







CYLINDER Borer With Hydraulic Feed, Roller Bearing Heads, and Fixture for Boring an Eight-Cylinder Motor. The cross section view above shows the type of column and slide used. The view at right is a section through the slide and gib

The machine illustrated, the No. 13, is recommended for heavy roughing operations. The rigidity of the construction is said to make it unnecessary to pilot the boring bars either at the top or bottom, although this can be done if desired. The column or housing is of box section and extends down to the floor, the base being bolted to the face of the column. Counterbalancing weights are on the inside of the column. The main drive may be either direct by motor or from a countershaft. From the main drive shaft the power is transmitted to a shaft with hardened spiral gears and through hardened spur gears.

The sides of the spindle housings or heads are accurately scraped and furnished with the necessary spacers so that all the heads can be bolted together to the desired spacing. Spindles are mounted in Timken tapered roller bearings which may be adjusted for wear simply by adjusting the nut on the end of the spindle. Special bronze spiral gears mounted on the spindles mesh with the main driving spiral gear, and by means of force feed lubricating system the entire assembly is flooded with oil. Provision is made against oil leakage around the spindles.

Spindle drive is from the same motor that drives the Oilgear pump. The cylinder is 3⅞ in. in diameter, 36-in. stroke. The entire control of the feed cycle is automatic. Upon moving the starting lever, the rail on which the spindles are mounted is brought down rapidly to the cutting position, whereupon the lever shifts to the slow feed. Upon completion of the boring operation the lever again shifts automatically to the reverse position, giving a rapid return to the rail unit. When the cycle has been completed the feed is thrown out until the operator again engages it. The rate of feed is changed by adjusting a conveniently located valve on the pump unit. If desired the oil circuit can be arranged to give two slow feeds forward.

The machine here illustrated is tooled up for an eight-cylinder motor. The fixture clears the face of the column and is bolted to the wings at the side of the column. Adjacent spindles bore alternate holes in the block, this being necessary because the spacing of the cylinder bores is too close to permit use of a construction having roller bearings. One cylinder is completed at each cycle of the machine. The castings are brought to the machine on a conveyor and pulled into the fixture by means of the latch mounted on a rack, which is operated by a crank at the front of machine. Each time a new block is pulled into the fixture the completed block is forced out at the right-hand side of the machine. The blocks are brought to their approximate location in this manner, and then permanently located by dropping the lever at the right-hand side of base, which raises the locating pins into the locating holes in the pan rail. Then by means of another lever the weights are dropped, clamping the two castings securely.

The smaller machine, the 10-D, is similar except that spindle units having tapered bronze bearings are used in place of roller bearings, permitting closer center distances to be used. This machine is recommended where the boring bars are piloted at the top and bottom of the fixture.

Specifications of the No. 13 and 10-D cylinder borers are respectively: Center distance between the two V-guides, 27½ in. and 21½ in.; floor space required, 7 ft. 8 in. by 6 ft. 4 in. and 7 ft. 2 in. by 5 ft. 4 in.; and approximate shipping weight, with fixtures, 22,925 lb. and 16,500 lb.

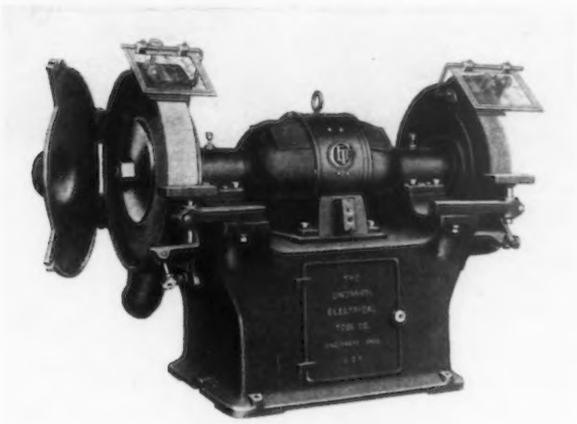
Wood pattern shop No. 2 of the Commonwealth Steel Co., Granite City, Ill., on Feb. 2 completed a safety record of 1000 days without a lost-time accident. About 100 men are employed in the department.

Interstate Iron & Steel Co., Chicago, had net profit of $409,784 in the year ended Dec. 31, 1927. This compares with $900,278 in the previous year.

Heavy-Duty Grinders for Foundry and Steel Mill Service

For heavy-duty work in foundries, steel mills, forge and other shops, the Cincinnati Electrical Tool Co., a subsidiary of the R. K. Le Blond Machine Tool Co., Cincinnati, is offering a new line of 5-, 7½- and 10-hp. floor grinders.

Motors are fully inclosed and the spindle is mounted on four Timken tapered roller bearings, which run in



The Spindle Is Mounted on Four Tapered Roller Bearings Which Run in Oil

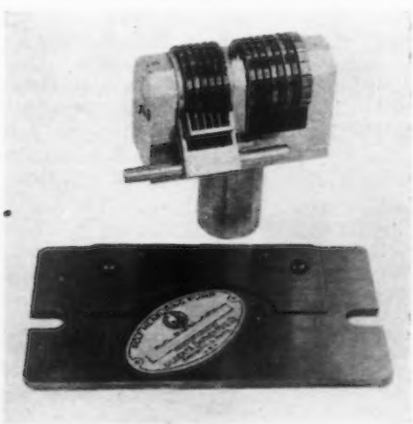
oil. Provision has been made for excluding grit and dust from the bearings and wear between the cup and the cone of the bearings can be taken up conveniently by means of an adjusting nut. Wheel guards are of cast steel. They are equipped with exhaust connections and have a 4-in. adjustment for wear of the wheels. Hinged covers entirely inclose the sides of the wheels, flanges and nuts. Non-breakable adjustable eye shields as well as chip breakers are provided over each grinding wheel. The grinding rests are adjustable and can be removed entirely.

The spindle is of nickel alloy steel, of one piece, and is turned and accurately ground to size. Wheel flanges and nuts are machined to be in balance with the spindle, thus minimizing vibration. The grinding wheels have a 12-in. bore, which is emphasized as permitting a saving in the initial cost of the wheels and as minimizing the discarded wheel losses. The starter is of the safety type, fully inclosed, with both overload and under voltage protection, and is mounted in the base. Push-button control station is mounted on the motor frame. The machines can be equipped for alternating current, 220-440 or 550 volts, 2 or 3 phase, and for direct current of 115 or 230 volts.

Special Double Numbering Head

A special double numbering head, designed to reduce the cost of marking name-plates shown in the accompanying illustration, has been furnished recently by the Noble & Westbrook Mfg. Co., Hartford, Conn.

There are two groups of wheels. The six wheels at the left operate automatically for serial numbering, while the wheels at the right mark such information as catalog number, model number, date, etc. The latter are changed by hand as required. Between the two groups of wheels there is a star design segment stamp which is inserted directly into the support. The center support serves to strengthen the entire device.



The Six Wheels at the Left Operate Automatically for Serial Numbering

Combination Disk and Floor Stand Grinder

The Hisey-Wolf Machine Co., Cincinnati, has placed on the market the 3½-hp. combination disk and floor stand grinder here illustrated. The spindle of the machine is of steel and of heavy construction to assure permanent concentricity of the disk. It is mounted on two annular ball bearings which take the radial load, end thrust being taken on a double-acting, self-alining thrust bearing. A plain work-table measuring 8¼ x 9½ in. is standard equipment, but a universal lever feed table 6½ x 13 in. is available as an extra. Other standard equipment includes a 15-in. diameter steel disk, a full safety combination wheel guard, and automatic safety motor starter. The grinding wheel, 14 in. in diameter and 2½-in. face, is furnished to order only.

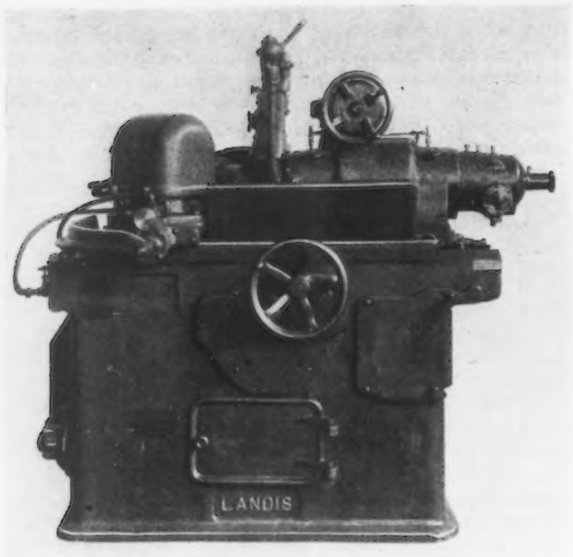
The machine is driven by a 60-cycle, 220- or 440-volt, 3-phase, 1725-r.p.m. alternating current motor, or a 115- or 230-volt, 1725-r.p.m. direct current motor. The grinders may be furnished special for 2 phase, also for 50 cycle at 1425 r.p.m.; 40 cycles at 1125 r.p.m.,

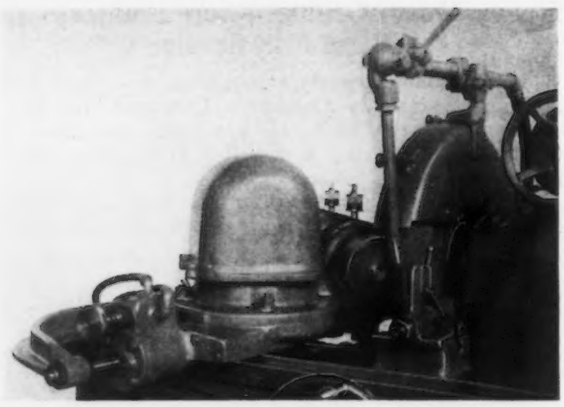
A 14-In. Grinding Wheel Is Employed. The steel disk is 15 in. in diameter

and 25 cycles at 1425 r.p.m. They can also be equipped for special voltage from 110 to 550 volts and for single phase service with improved repulsion-induction motors. The d.c. machines can be supplied for special voltages up to 250 volts.

River shipments of iron and steel products in January were 330 net tons on the Allegheny, 78,069 tons on the Monongahela, and 69,750 tons on the Ohio River, according to the Pittsburgh office of the United States Engineers. In December the tonnages were 900, 65,922 and 68,472 tons, respectively. In January, 1927, there were no shipments on the Allegheny, 27,900 tons on the Monongahela and 26,409 tons on the Ohio.

The annual banquet of the Traffic Club of Pittsburgh, which includes most of the traffic officials of the iron and steel companies of the Pittsburgh district, is to be held at the William Penn Hotel, Pittsburgh, Thursday evening, March 8. Former Governor E. P. Morrow of Kentucky is to be the principal speaker. There is also to be a demonstration of the televocal system by R. J. Wensley, Westinghouse Electric & Mfg. Co.





CHANGE From One Type or Size of Valve Involves Only Change of Work-Holding Fixture. Arrangement of the work-head, wheel-head and diamond holder may be noted from view above

Semi-Automatic Hydraulic Machine for Grinding of Valve Faces

ALTHOUGH designed primarily for the grinding of similar parts in large quantities, the semi-automatic hydraulic valve face grinder here illustrated is adapted for the grinding of valves of various types and sizes. Change from one type or size to another merely involves changing to a suitable work-holding fixture.

The machine is a recent addition to the line of the Landis Tool Co., Waynesboro, Pa. It incorporates the bed, wheel-base, rear drive, oil and water service units of the company's 6-in. plain hydraulic grinder, but the work carriage, work-head and cross-slide have been designed particularly for valve face grinding operations.

The work-head is mounted at an angle of 45 deg. on a cross-slide which moves at right angles to the axis of the grinding wheel spindle. Hydraulic power, operating through a piston at the rear of the head, moves the cross-slide to and from the wheel. A ½-hp. constant-speed motor mounted on the head drives the work-spindle through silent chain and sprockets. Movement of the head automatically regulates the rotation of the spindle, a limit switch on the underside of the slide making the electrical contact. A single lever at the front of the slide controls this movement through a reversing valve.

Positive and accurate holding of the work is a feature emphasized. The work-holding fixture, which is air-operated from a cylinder at the rear of the work-spindle, consists of a clamping block on which the valve stem is placed; a clamping arm which carries the clamping shoe; and a locator which positions the valve so that the face will be properly presented to the wheel. Movement of the work-head automatically regulates the clamping and releasing of the clamping shoe.

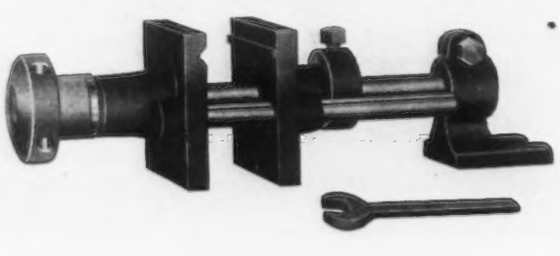
When the work-head is in the back position, the work-clamping shoe is released and rotation is stopped. In this position a valve is placed in the work holder. When the control lever is moved, the work-head moves toward the grinding wheel, the work is clamped, electrical contact is made and the work starts to rotate. The work-head continues to move rapidly toward the grinding wheel until contact is made between the wheel and the work, when it slows down automatically to a predetermined grinding feed and continues to move in until it comes against a positive sizing stop. After the work has made several revolutions, to allow the wheel to cut out, the control lever is reversed, which causes the work-head to move back rapidly. As the head approaches the extreme back position, the electrical connection is broken and the work stops rotating; at the same time the work clamping shoe is released automatically.

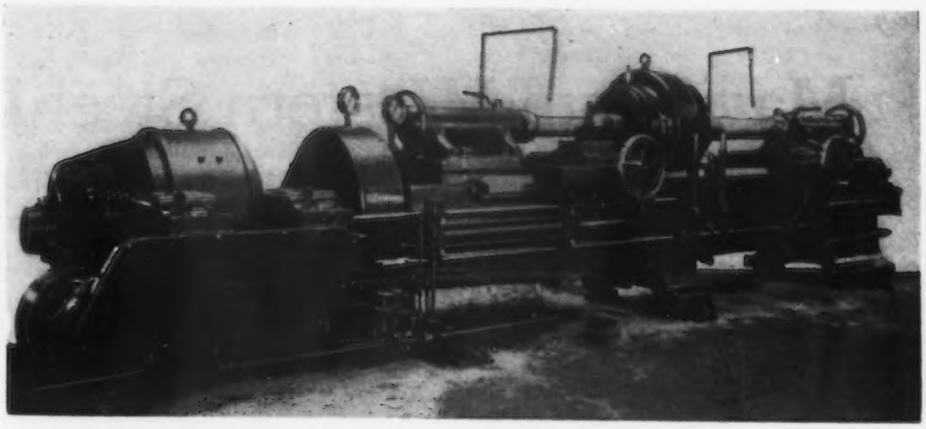
The grinding wheel head is massive and is equipped with an alloy steel spindle, which runs in bronze cap bearings lubricated under pressure. A 24 x 1 x 8-in. wheel is used. A reciprocating-type wheel spindle is furnished, and on this particular work the lateral movement is ½ in. Except to compensate for wheel wear or when the wheel is dressed, the grinding wheel-head is not moved. The company's standard plain hand feed is provided. The wheel-truing fixture is clamped to a pad on the top of the special work carriage, and because of its position need not be removed when not in use.

Power for the work-head feed is furnished by a geared oil pump driven from the rear drive shaft, a portion of the base of the machine being utilized as a container for the oil. The work carriage is traversed by hand, a back gear arrangement giving a slow speed for truing the grinding wheel. The machine may be arranged either for lineshaft or direct motor drive, but in either case an electrical work drive motor is required. A 5-hp. 1150-r.p.m. main drive motor is employed.

Offers New Drill Press Vise

MILLER & CROWNINGSHIELD, Greenfield, Mass., are marketing the vise illustrated, which is designed for use on drilling machines. The jaws of the device measure 3½ x 3½ in., and open 6 in. They are square on all sides so that the entire vise may be turned any side up. Round, square or hexagon rods can be held in the jaws and drilled either in the end or on the side. By loosening the clamp screw in the collar the rear jaw may be quickly slid to any position and clamped. The small shoulder on the rear jaw is intended to provide a convenient stop or rest for locating small pieces to be drilled. The work is held by tightening the clamp knob on the front jaw. The guide bars form a base on which to rest the work while drilling. The angular casting at the rear can be bolted to the drill press table to prevent turning of the vise if the drill should catch in the work. The weight of the device, which is designated as the No. 1 drill press vise, is 10 lb.





Feeding Pressure Is Applied to Each Tool by Oil Cylinders Attached to the Under Side of Each Carriage. Feeds from 0 to ½ in. per revolution are instantly available

Center-Drive Axle Lathe Equipped with Hydraulic Carriage Feed

HEAVY-DUTY center-driven axle lathes with hydraulically actuated carriages, using Oilgear equipment, have been brought out by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. The use of this type of feed mechanism eliminates the usual feed gearing, and in addition to reducing manual effort on the part of the operator, is said to speed up production.

Positive feeding pressure is applied to each tool by means of oil cylinders attached to the under side of each carriage at front and back of the machine. This application of feed pressure directly under the tool and held rigidly in balance is emphasized as permitting heavier cuts and feeds than usual. Each carriage is provided with adjustable automatic stops, and the control levers for setting the rate of feed and for power traversing the carriages are located at the center of machine within easy reach of the operator. Any feed from 0 to ½ in. per revolution is immediately available; power traverse is at the rate of 6 ft. per min.

The main drive may be by adjustable-speed motor through a single train of gears or by constant-speed motor through a three-speed gear box. The center driving head is equipped with Sykes herringbone gears. The two Oilgear pumps are driven by one 3-hp. constant-speed motor. The machine illustrated is equipped with 35-hp. adjustable-speed motor for especially heavy duty, but usually a 25-hp. motor is employed.

New Line of Engine Lathes

ENGINE lathes designated as the LN series, and available in three-step cone, double back geared, and all-geared head models, 16- and 18-in. sizes, have been added to the line of the Rahn-Larmon Co., 2935 Spring Grove Avenue, Cincinnati.

The bed is heavy and of hard, close-grained iron that will not, it is said, wear hollow. The spindle is of forged steel and has a hole 1 5/16 in. in diameter. The front spindle bearing is 2⅝ in. in diameter and 5 in. long, and the rear bearing 1⅞ in. in diameter, 3½ in. long. These bearings are oil grooved and supplied with oil from a reservoir.

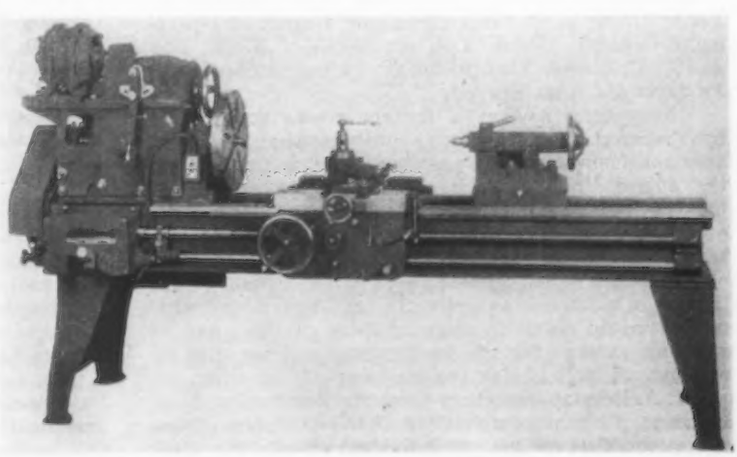
Both carriage and apron are large and heavy, the carriage being carefully scraped and having a 24-in. bearing on the bed. Feed reverse and interlocking device, to prevent engagement of the feed rod and lead screw at the same time are provided. The back of the carriage is arranged for the application of a taper attachment. The quick-change gear box, of new design, is arranged to cut from 2 to 40, including 11½, threads per inch. Thirty-six feeds ranging from 0.0116 to 0.232 are obtainable. The tailstock is graduated for set-over work. The diameter of the tailstock spindle is 1 15/16 in. and the traverse 7½ in. The compound rest has wide bearing surface and is gibbed throughout; dial swivel and cross-feed dial are accurately graduated. The countershaft, supplied as regular equipment, is of double friction type, with self-oiling journals.

The swing of the 16-in. and 18-in. lathes, respectively, is: Over the Vees, 17 in. and 19 in.; over the carriage, 11 in. and 13 in.; and over the compound rest, 10 in. and 11½ in. The machines are available with beds 6 ft. 6 in. in length and up, in even 2-ft. lengths. The weight of the 18-in. x 10-ft. three-step cone, double back geared lathe with quick-change gears is 2050 lb. The machine illustrated is an 18 in. x 10 ft., geared-head unit with nine speeds and 2-hp. motor drive.

Forecasts End of Overproduction

GENERAL distribution of employment and conservation of production will be accepted within 10 years as the only true measure of prosperity, according to an article by James J. Davis, Secretary of Labor, in the February number of the *Monthly Labor Review*, Washington. He is of the opinion that the real object to be sought in the future is the manufacture of just enough to satisfy the national demand and foreign orders.

"Then we shall see at last some real conservation," he points out. "Economics will then live up to its name. We shall have real economy in the conservation of our natural resources, our raw materials, our national energies and, above all, a saving in our man power. We shall not wear out our workers, but rather lengthen their lives and usefulness at the same time that we lighten their labors." The economy of time that will result is held to be most important of all. Every ounce of production above capacity to consume is declared to be only a waste."



Nine Speeds Are Obtainable Through the Geared Head. A 2-hp. motor is employed

May Form Western Steel Institute

Conference at Del Monte, Cal., Decides to Consider Plan to Group Eleven Pacific and Mountain States — Minimizing of Foreign Steel Competition One Object—F. J. Koster Reelected Chairman

A PLAN to form a Western States Iron and Steel Institute, taking in 11 Pacific Coast and Rocky Mountain States, received consideration at the fourth annual conference of the Iron, Steel and Allied Industries of California at Del Monte on Feb. 17 and 18. A resolution was adopted referring the matter to a committee, which will submit a report at the next meeting of the association's executive committee.

About 200 steel men, representing Eastern and Western mills, structural steel fabricators, merchant steel and reinforcing steel jobbers and manufacturers who use steel in various forms, were present at the conference, perhaps the largest convention of its kind ever held on the Pacific Coast.

Among the speakers were Ray M. Hudson, assistant director of commercial standards, Department of Commerce, Washington; Charles J. Graham, president Bolt, Nut and Rivet Manufacturers' Association, Pittsburgh, and Charles F. Abbott, executive director American Institute of Steel Construction, New York.

Frederick J. Koster, president California Barrel Co., San Francisco, was reelected chairman of the conference.

The following objectives for the coming year were adopted by resolution: Centralized leadership, standard specifications and practices, uniform building code, support of California payrolls, extension of marketing territory in Western States, and publicity.

Before the opening of the conference, special group and committee meetings, representing foundries, general manufacturers, steel mills, merchant and reinforcing steel jobbers and fabricators, were held on Feb. 16 to discuss trade practices and general problems pertinent to each of the groups.

Reinforcing Steel Institute Elects Officers

The annual election of officers of the California Reinforcing Steel Institute was held on that day and resulted as follows: J. E. Heber, Pacific Coast manager Truscon Steel Co., Los Angeles, president; Charles M. Gunn, president Gunn, Carl & Co., San Francisco, vice-president; N. E. Dawson, Soule Steel Co., Los Angeles, treasurer. The following directors were elected: E. L. Soule, president Soule Steel Co., Los Angeles and San Francisco; W. S. Wetenhall, president W. S. Wetenhall Co., San Francisco; R. G. Falk, vice-president Badt-Falk Co., San Francisco and Los Angeles, and T. M. Davidson, Badt-Falk Co., Los Angeles.

Among the prominent visitors at the conference were William G. Clyde, president Carnegie Steel Co., Pittsburgh; G. Kahn, vice-president Truscon Steel Co., Youngstown; E. O. Shreve, manager industrial department General Electric Co., Schenectady, N. Y., and A. T. DeForest, vice-president United States Steel Products Co., San Francisco.

The general session of the conference was opened by Frederick J. Koster, who outlined what had been accomplished during the past year, saying that among the outstanding achievements were those of extending the market territory for California producers, the establishing of better purchasing policies and the putting into effect of standard practices. He also pointed out that much had already been done toward establishing a standard analysis for castings which ultimately would result in more uniform castings and in effecting savings for the foundryman and the user of castings as well as for the producer of pig iron.

M. A. Beeman, secretary Concrete Reinforcing Steel Institute, Chicago, emphasized the importance of cooperative effort as against individual effort. Mr. Beeman recounted what the institute he represents had achieved in a relatively brief time to secure for its members larger markets, better prices and more satisfactory methods of doing business in the face of domestic and foreign mill competition and low prices.

In speaking on the subject of standardization, he said: "Working in conjunction with the Department of Commerce, the steel mills and other interested parties, the reinforcing steel industry has succeeded in reducing the number of cross-sectional areas of steel reinforcing bars from 40 to 11 sizes. The result has been a tremendous saving to the steel producer and to our member jobbers through the elimination of heavy charges that were formerly necessary by virtue of carrying in stock many sizes seldom called for, and by increasing the facilities for handling steel."

Advantages Derived from Simplification

Ray M. Hudson, of the Department of Commerce, in his address on "Standardization and Its Relation to the Iron and Steel Industry on the Pacific Coast," said that thousands of American business men have come to recognize simplification and standardization as fundamental forces in modern business.

He said: "When the Hoover committee made its survey of waste in industry, it found wastes ranging from 29 per cent in the metal trades to 64 per cent in the manufacture of men's ready-made clothing. Fifty per cent of the responsibility for this waste was found to be chargeable to management and 25 per cent to labor; the remainder to conditions beyond the control of either labor or management.

"The Department of Commerce has helped to bring about simplification in many lines, and a few of the completed simplifications of interest to the iron and steel industry have resulted in the reducing of solid section steel windows from 42,877 sizes to 2244 sizes, and sheet steel (jobbers' sheets) from 1819 to 263 sizes. In the latter instance the sheet steel committee estimates that this simplification has saved the industry about $4 a ton or $2,400,000 annually.

"Pacific Coast manufacturers will find it to their advantage to concentrate their production and sales efforts on these simplified lines, for they are always in demand and will therefore move out to the trade in due season. Distributers will find these simplified lines easy to buy and sell, thus giving them a quicker turnover."

Mr. Hudson said, in speaking of foreign competition: "The greatest bulwark against invasion of our domestic iron and steel markets by foreign producers is American inventive genius and American executive capacity for organization. The bogey of foreign competition is bound to recede as we mobilize our resources and our collective energies for the best interests of our industries and the public whom they serve. Simplification, standardization and research are three formidable allies in any industry."

Radical Changes Necessary to Insure Prosperity

Charles J. Graham spoke on "Cooperation, the Essential Factor in American Prosperity." He said that close students of business conditions realize that some very radical changes are necessary if a condition is to be brought about which will assure a continuance of the prosperity enjoyed during the past three years and "to take the word profitless out of the picture."

Mr. Graham said: "There is no argument against the uneconomic unsoundness of one-half of our business institutions doing business at a loss, as no doubt will be shown when all returns are in for 1927. The correction of this condition is our greatest national problem and must be solved if we are to stabilize and

perpetuate present labor conditions, as satisfactory labor conditions and present high wages are responsible for the degree of prosperity we have had. Any underlying condition which would affect in any way our ability to keep up the present rate of employment or of wages paid would have the effect of cutting down buying power, and the inevitable result would be a long period of depression.

"The subject of paramount importance to the Pacific Coast," he said, "is that of the rapidly growing importation of foreign materials, such as steel, window glass and various other materials. Ways should be found immediately to correct this situation which, if permitted to continue at its present rate of increase, will eventually react and do more to break down what you are endeavoring to build up than any other single factor or group of factors you are in contact with."

Another series of group meetings was held on the afternoon of Feb. 17, and the chairmen of the various groups reported in a general way at the closing session on the following morning, more detailed reports to be submitted to the executive committee at a later date.

Those who addressed the closing meeting were John B. Leonard, structural engineer, San Francisco, who spoke on "The New Uniform Building Code and Its Relation to the Iron and Steel Industry of California"; Frank C. Mortimer, vice-president Citizens National Bank, Los Angeles, and Charles F. Abbott, American Institute of Steel Construction, whose address was given in part in THE IRON AGE of Feb. 23, page 531.

Steel Trade Should Become "Profit-Minded"

Executives in control of policies of steel companies should become "profit-minded" with a view to putting their net income in line with less important businesses, was the advice given by Mr. Mortimer, banker. "There is no law against making good profits," Mr. Mortimer said. "Understandings among those engaged in specific lines of business which help to make fair profits should not be looked upon as reprehensible."

Mr. Mortimer said that if he were asked to write a prescription for the steel business he would make the following suggestions:

Continue research and educational work. Find new uses for steel and inform the public how to apply them.

Watch costs more carefully. Reduce overhead and distribution expense where possible.

Manufacture or contract in quantities sufficient to supply the requirements of regular customers and such additional quantities as can be sold at a good profit. Tighten up on execution and enforcement of contracts.

Consolidate some plants, if economical to do so. Disregard excess plant capacity, and discontinue unprofitable volume.

Maintain sales volume in proper relation to demand.

Put a price on products that will permit a continuance of good wages to employees and good returns to stockholders.

Take or follow the lead in further and more effective moves for closer cooperation and better understandings in the industry.

Earnestly and sincerely adhere to your present code of ethics, or to such revised practices as may be decided upon for the betterment of conditions.

Officers and Group Committees Named

Frederick J. Koster was unanimously reelected chairman of the executive committee. Walter Taylor, vice-president Llewellyn Iron Works, Los Angeles, vice-chairman from Los Angeles, and E. L. Soule, Soule Steel Co., San Francisco, vice-chairman from San Francisco.

The following group committee men were announced:

MANUFACTURERS OF SOUTHERN CALIFORNIA: George J. Kuhrts, Jr., Standard Boiler & Steel Works, Los Angeles, chairman; H. Riggs, Baasch-Ross Tool Co., Los Angeles; W. Wardman, Alloy Steel & Metal Co., Los Angeles; A. J. Morse, Alloy Steel & Metal Co., Los Angeles; George Koehler, Federal Tank & Steel Works, Los Angeles.

MANUFACTURERS OF NORTHERN CALIFORNIA: H. W. Force, California Corrugated Culvert Co., Berkeley, chairman; R. M. Alvord, General Electric Co., San Francisco; G. A. Bahler, Caterpillar Tractor Co., San Leandro; R. A. Folsom, W. R. Ames Co., San Francisco; H. P. Phillips, Link-Belt, Meese & Gottfried Co., San Francisco.

STRUCTURAL FABRICATORS, SOUTHERN CALIFORNIA: E. H. Gohle, McClintic-Marshall Co., Los Angeles, chairman; Guy C. Boyton, Baker Iron Works, Los Angeles; R. T. Miller, Union Iron Works, Los Angeles; C. Fred Brombacher, Brombacher Iron Works, Los Angeles; G. W. Suarett, Llewellyn Iron Works, Los Angeles.

STRUCTURAL FABRICATORS, NORTHERN CALIFORNIA: H. Mortenson, McClintic-Marshall Co. Central Works, San Francisco, chairman; Paul F. Gillespie, Judson-Pacific Co., San Francisco; S. S. Herrick, Herrick Iron Works, Oakland; Charles E. Spencer, California Steel Co., Oakland; H. Morris, Western Iron Works, San Francisco.

MERCHANT STEEL JOBBERS, SOUTHERN CALIFORNIA: Shannon Crandall, California Hardware Co., Los Angeles, chairman; C. A. Ducommun, Ducommun Corporation, Los Angeles; D. P. N. Little, A. M. Castle Co., Los Angeles; E. Jungquist, Percival Steel & Supply Co., Los Angeles.

MERCHANT STEEL JOBBERS, NORTHERN CALIFORNIA: F. J. Bruzzone, Baker, Hamilton & Pacific Co., San Francisco, chairman; H. D. Simon, Foucar, Ray & Simon, San Francisco; Roy L. Sanford, A. M. Castle Co., San Francisco; C. H. Merrill, Holbrook, Merrill & Stetson, San Francisco; F. F. Thomson, Thomson-Diggs Co., Sacramento.

STEEL MILLS, SOUTHERN CALIFORNIA: Harvey Hewitt, Southern California Iron & Steel Co., Huntington Park, chairman.

STEEL MILLS, NORTHERN CALIFORNIA: S. S. Lawrence, Columbia Steel Co., San Francisco, chairman; E. S. Houdlette, Pacific Coast Steel Co., San Francisco.

REINFORCING STEEL JOBBERS, LOS ANGELES: J. E. Heber, Truscon Steel Co., Los Angeles, chairman; N. E. Dawson, Soule Steel Co., Los Angeles; E. L. Hansen, Blue Diamond Co., Los Angeles; D. N. Folling, Pacific Coast Steel Co., Los Angeles; George Parker, Fenton-Parker Material Co., San Diego.

FOUNDRIES, SOUTHERN CALIFORNIA: Martin Madsen, Madsen Iron Works, Los Angeles, chairman; G. A. Axleson, Axelson Machine Works, Los Angeles; Carroll A. Stilson, Metal Trades Manufacturers Association, Los Angeles; Lloyd D. Kay, Kay-Brunner Steel Casting Co., Los Angeles; Frank M. Burger, Llewellyn Iron Works, Los Angeles.

FOUNDRIES, NORTHERN CALIFORNIA: George A. Gunn, Best Steel Casting Co., San Francisco, chairman; C. E. Williams, Columbia Steel Corporation, San Francisco; D. Guild, Phoenix Iron Works, Oakland; C. M. Henderson, McAulay Foundry Co., Berkeley; A. D. Scoville, Pacific Coast Foundrymen's Association, San Francisco.

The following resolutions were adopted by the conference:

Centralized Leadership. The development of a greater centralized leadership in the iron and steel industry by a more energetic continuation of the coordination work of the Iron, Steel and Allied Industries of California through the annual Del Monte conference and the continuation of the group meetings throughout the year.

Standard Specifications and Practices. Coordination of technical groups of architects, contractors and engineers in connection with standard specifications affecting the iron and steel industry of California.

Uniform Building Code. The active cooperation of the iron and steel industry in the adoption of a uniform building code and its general acceptance and application by the municipalities of California.

Support of California Payrolls. Continuation on a more energetic basis of the work of the Iron, Steel and Allied Industries of California to develop a statewide attitude of appreciation of the value of industrial payrolls in California, for the purpose of reducing foreign importations to the minimum, where such importations seriously interfere with the proper development of iron and steel industries in California.

Extension of Marketing Territory in Western States. Continuation of the traffic program in obtaining rate adjustments that will make it possible for California industries to serve new territories in the Western States that are logically a part of the trade area of California industries.

Publicity. Conduct an active program of publicity through the press and trade magazines of the State for the purpose of expanding existing industries and encouraging new payrolls in the iron and steel industry of California with due regard and protection for existing industries.

Western States Iron and Steel Institute. That a special committee of three be appointed by the executive committee to investigate the problem of formulating a Western States Iron and Steel Institute to comprise the 11 Western States; further, that this committee be requested to attend the Northwestern Iron and Steel Conference at Tacoma, Wash., Feb. 27, and submit a report on it at the next meeting of the executive committee for consideration.

Business Analysis and Forecast

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

GENERAL BUSINESS OUTLOOK

Favorable Factors

1. The continued rise of the P-V line indicates further improvement in the relation between demand and supply.

2. The trend of building activity was upward in January.

3. The automobile industry is expanding.

4. Unfilled orders show an upward trend.

5. Money is easy.

6. Factory employment and payrolls declined less than usual in January.

Unfavorable Factors

1. Retail trade declined sharply in January.

2. Considerable unemployment exists.

3. Purchasing power of farmers has declined again.

4. Profit margins are low in many industries; failures numerous; new enterprises established few.

5. Severe competition and price cutting in the automobile field.

6. Bank credit over-extended for security market operations; brokers' loans excessive.

7. A reaction in the stock market.

8. Unfavorable political situation.

OBVIOUSLY there are several rather heavy drags on the trend toward prosperity, notably political uncertainty, reduced purchasing power of factory laborers and farmers, and the necessity for correcting inflation in the stock market. But the more barometric basic indexes such as the P-V line, building activity and unfilled steel orders still point upward. Even the trend of employment became more favorable in January. Political uncertainty is about offset by prospects of continued easy money. In general it may be said that the unfavorable indications are mostly indexes of the existing semi-depressed condition growing out of past developments, and may well be taken as promises of recovery later on. The favorable factors forecast early improvement.

Continued Expansion Indicated

THERE is no need this month for much discussion of the P-V line (ratio of commodity prices to physical volume of trade) and its relation to ingot production. Briefly stated, the facts are that a continued rise occurred in the P-V line, together with an unusually sharp upturn in ingot production. About the usual time has elapsed between the upturn in the P-V line and that in steel production. In 1921 some seven months intervened between the rise in the barometer line and the upturn in steel. Exactly seven months intervened between the two occurrences last year, the P-V line having risen in May and the ingot curve (adjusted for seasonal variation) moving up in December.

Perhaps there is some interest in speculating as to the future. In our chart the P-V line has been on the up-grade for eight months; steel production has risen during but two months. It might, therefore, be hoped that a further rise in steel production will occur and one might even go so far as to hope that the expansion will last for six months following January, or until July. It could hardly be hoped that the rise would go forward steadily without interruption, but, allowing for seasonal conditions, one might expect the trend to be mostly upward.

Two facts, however, must be noted as moderating such hopes: (1) The rise of the P-V line, after being quite sharp for four months, has been rounding off; (2) steel production spurted so sharply in January that it ran well above normal. Also there are signs indicating that the P-V line may possibly decline in the near future. These facts suggest the possibility that the supply of steel may gain on demand so rapidly that the rise in steel production may not carry through. It must be admitted that the expansion in the steel industry would now be more likely to show a sustained movement had production not been stepped up so rapidly.

All this is highly speculative, and is probably over-

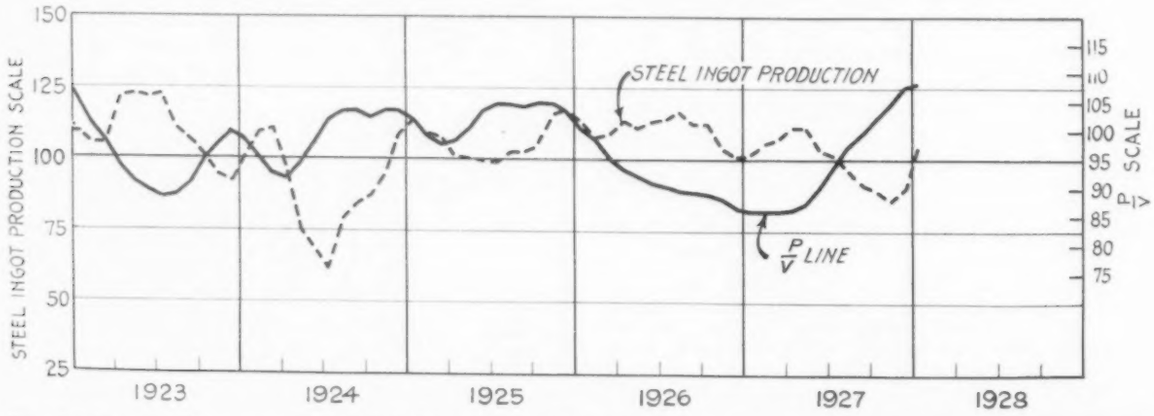


Fig. 1—Upward Movement of the P-V Line (Ratio of Commodity Prices to Physical Volume of Trade) Has Continued for Nine Months. Steel production responded sharply in January and heavy tonnages, with better prices, may be expected for several months

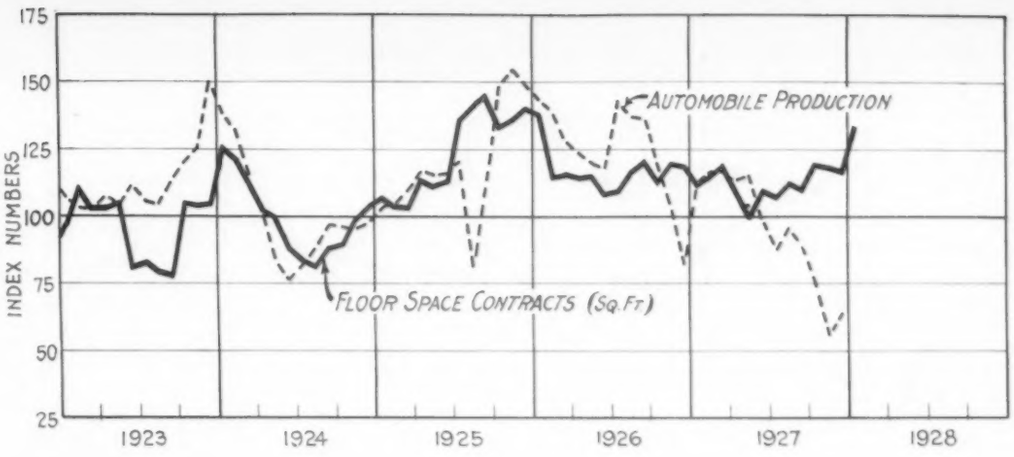


Fig. 2 — Potential Demand for Steel from Construction Activity Has Been Well Sustained. Improvement in the automobile demand for steel is thought to be at hand

working the idea that any general business barometer can be expected to forecast steel production with mechanical accuracy. It can be said, however, that *the prospects for business in general are sufficiently favorable to warrant the anticipation that the steel industry will find support at an above-normal rate of production during a period lasting from four to six months.* For example, the building program is considerable and the automobile industry will not reach the peak of its production much before May.

Buildings and Automobiles Move Upward Together

THE chief reason and justification for the recent expansion in the steel industry is apparent in the second chart. Incidentally, too, there appear some of the reasons for anticipating an early recovery in general business. In January, after making all due allowance for seasonal conditions, the trend of both building activity and automobile production was sharply upward. This is the first time that such a statement could be made since January, 1925.

Floor space in construction contracts awarded, as reported by F. W. Dodge Corporation, actually increased a little in January, in spite of the fact that a decline would have been normal for the month. The adjusted index is 133.6 per cent of the average for 1921-1927, against 117 per cent in December and 111.7 per cent a year ago. This increase is the more impressive in that building permits showed a similar trend. It continues to seem reasonably certain that building activity will hold somewhat above normal, to the great benefit of steel and many other industries, including rail and truck transportation.

Total production of motor cars and trucks in the United States and Canada jumped from 136,600 in December to 233,500 in January, an increase of over 77 per cent in the average daily output. Allowing for seasonal variation, our adjusted index is 103.3 per cent of the average of the last seven years, and compares with 63.6 per cent in December, and with 112.5 per cent in January, 1927. While automobile production is still below a year ago, the trend is sharply upward and at least the usual seasonal gains are probable in February and March. Ford has been slow to get into production, and the total sales of automobiles have not yet shown so great a gain as had been hoped for. But such leading companies as General Motors and Studebaker show large increases in new business. This trend should help steel, glass, non-ferrous metals, textiles and rubber—some of which badly need help.

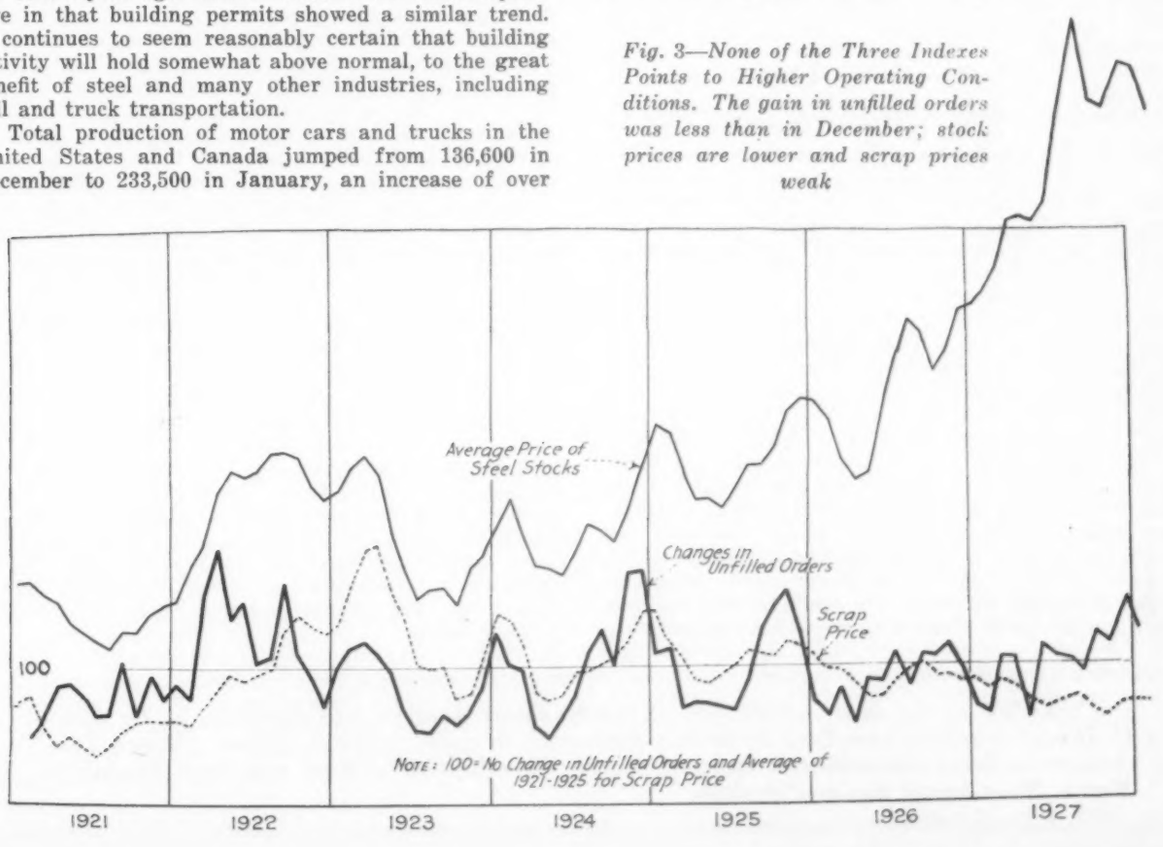
Building activity is an excellent indicator of the business trend. It is, therefore, significant to note that contracts awarded have taken a general upward course since last May.

Some Barometers Point Downward

IN our third chart, however, none of the indexes point upward. The unfilled orders barometer is down; the common stocks of steel companies are down; scrap prices are barely steady. In view of the expansion in the steel industry since January, and the somewhat stronger markets for finished steel, this showing seems paradoxical.

The decline in the unfilled orders barometer is not so bad as it might seem. As long as the curve is

Fig. 3—None of the Three Indexes Points to Higher Operating Conditions. The gain in unfilled orders was less than in December; stock prices are lower and scrap prices weak



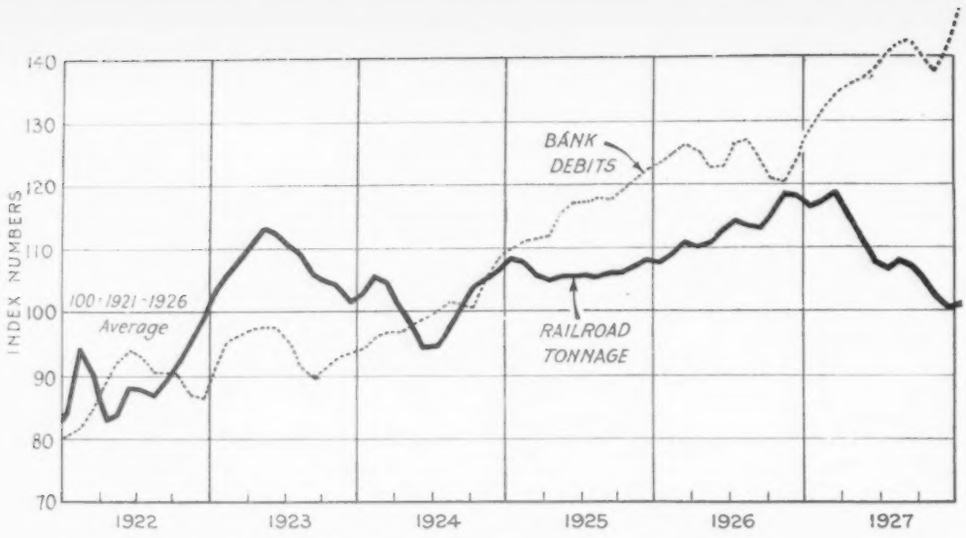


Fig. 4—Freight Traffic Has Reached What May Prove to Be the Low Point. It is nearly 25 per cent below November, 1926. Bank debits, on the other hand, have made the highest record ever known, but it is largely speculative

above the base line in the chart, some increase in unfilled orders is indicated. The decline in the curve in January simply means that the increase in unfilled orders in that month was less than the increase in the preceding month. The same situation existed in January, 1925. The barometer line was headed downward in January, 1926, and January, 1927, but in those months it fell below the base line, indicating an actual decrease in unfilled orders. It must be admitted, however, that the rate of change in unfilled orders is a very sensitive barometer. Usually its decline means a decrease in new orders.

Usually, too, a decline in the unfilled orders barometer has anticipated weakness in steel stocks, one of the very few exceptions having occurred during the inflationary movement at the beginning of 1927. Certainly the present is no exception to the general rule. Already, in February, the average price of nine steel stocks during the first three weeks is as low as the low average of last November. During the period between last September and the present time, the decline which has occurred in steel stocks is the sharpest since the spring break in 1926. It begins to look as if the September peak in the price of steel stocks had fully discounted the present expansion in the industry.

In spite of the increase in steel production, the market for steel scrap shows no strength and the decline in the unfilled orders barometer would indicate further weakness. At the least, the trend of scrap prices leads to no optimistic conclusion.

Freight Tonnage Perhaps at Low Point

THAT business cycles exist, but that they differ widely in nature, is again illustrated by the fourth chart. Railroad freight traffic, after rising in November, 1926, to a point more than 20 per cent above the average for the six years 1921-1926, fell in December, 1927, to a point nearly 2 per cent below that average. These percentages are stated without making any allowance for long-time trend or normal growth in the country's requirements. But the figures, being based on the average for a series of recent years, are probably much the same as they would be if the percentages were calculated with reference to an estimated "normal." This represents a decline of nearly 25 per cent.

It is interesting to note that the decline in freight tonnage that occurred between the peak in May, 1923, and the low point in June, 1924, was only a little less, amounting in that case to about 21 per cent. Freight traffic figures give a very comprehensive picture of industrial activity, and, aside from strike influences, rather faithfully represent the course of the business cycle insofar as this can be done without considering prices and profits. *It is, therefore, of interest to note that we have already had a somewhat greater recession than occurred in the preceding business cycle.*

One difference between the last two cycles lies in the relatively prolonged gradual rise in industrial activity that went on during 1925 and 1926. Instead of rising sharply to a peak, as was the case in 1922-1923, industrial activity held irregularly to a moderately high level, acting almost as though it were being held in restraint by the relative weakness of commodity markets. But the decline during 1927 was similar in degree and in magnitude to that in 1923-1924.

Bank Debits and Securities Speculation

Another difference is found in the performance of bank debits. As shown in the fourth chart, the curve of bank debits was relatively low during the years 1921-1924 and relatively high in the years 1925-1927. This is true, even when allowance is made for a more sharply upward long-time trend in the bank debits. Average weekly bank debits made a new record in December, 1927, when the volume of freight traffic was at the lowest point since 1924. This rise in bank debits was not due to higher commodity prices and payrolls, for the broad trend of commodity prices was about level during the whole period from 1923 through 1927, and payrolls actually declined during 1927.

As we have pointed out before, the largest factor affecting bank debits must be speculation, and notably speculations in securities. In short, *the bank debits curve reflects the inflation in the stock market and gives some idea of the extent to which, after a brief period of liquidation in* 1926, *that inflation has been carried in* 1927. The wide spread between railroad tonnage and bank debits represents the effect of a lower basis of capitalization, "easy money," large corporate reserves (insuring dividends in spite of a decline in business), and hopefulness as to the future (leading to a willingness to buy and hold securities over a cyclical decline).

One thing is clear: Bank debits and bank clearings do not show the true trend of industrial activity. And, by the same token, the stock market is also not showing the same alinement with business conditions, in the ordinary sense of that term, as it has generally done in the past. This may represent in part a transition to a permanently higher level of security prices and of bank debits. But we are inclined to think that to some extent it represents a maladjustment and that, as the industrial volume expands and carries railroad tonnage higher, the basis of capitalization and money rates will be advanced for a while and stock prices and bank debits will ultimately decline to meet the rising tonnage curve.

Schedule of the next installments of the **Business Analysis and Forecast,** *by Dr. Lewis H. Haney, Director New York University Bureau of Business Research, follows:* **March 15**—*Activity in Steel Consuming Industries;* **March 22**—*Position of Iron and Steel Producers;* **March 29**—*General Business Outlook.*

Defines Engineering Trends in Steel

Recent Developments Reviewed by American Metallurgist—Expansion and Effect of Alloy Steels—Suggests Biological Concept of Metallurgy of Steel

A COMPREHENSIVE and valuable lecture on "The Trend of Engineering Developments in Steel" was delivered Friday evening, Feb. 17, by Dr. B. D. Saklatwalla, vice-president Vanadium Corporation of America, before a large assemblage of metallurgists and chemists in the main auditorium of the Chemists' Club, New York. The meeting was held under the auspices of the American section of the Society of Chemical Industry.

Growth of Alloy Steel Industry

Only a few of the outstanding features of Doctor Saklatwalla's broad treatment of this important subject can be touched on here. Phenomenal as the growth of general steel tonnage may seem, said the speaker in the early part of his address, the growth of alloy steels within the last few years has been still more surprising. The statement has been made, based on statistics, that the alloy steel industry has progressed 18 times as rapidly as the general steel industry in the last 15 years. Alloy steels have entered fields where their application could hardly have been prophesied. This development of alloy steel is undoubtedly responsible for our present-day engineering advancement. It is undoubtedly recognized that the advances of modern engineering are closely associated with the wonderful properties of the materials employed. But it may not be generally apparent that these properties are brought about by the effects of heat treatment carried to a high degree in the presence of alloys.

"It has been suggested in the past that the civilization of a nation is measured by the amount of sulphuric acid consumed by it, and again latterly it was suggested that the amount of steel scrap produced by it should be a truer measure," said Doctor Saklatwalla. "It would not be amiss here to set up another criterion, namely, that the civilization of a nation is proportional to the tonnage of metal heat treated by it."

Biological Concept of Steel Metallurgy

A large part of Doctor Saklatwalla's address was taken up with a discussion of the formation and structure of alloy steels, based upon an outline in diagrammatic form, representing the equilibrium changes during the process of solidifying and cooling where the composition in percentages of carbon and temperatures are coordinated. In connection with this outline, Doctor Saklatwalla drew the unique analogy that such an outline might be termed the biological concept of steel metallurgy. He insisted that the analogy is not merely a fantastic one, but a very real one. One area in the diagram he designated as the "prenatal" and another as the "area of adolescence." As in biology so in steel metallurgy, he contended, these prenatal influences have been found to be of tremendous importance. "As in biology, the care and nurture lavished on the steel at these periods is reflected in the ultimate engineering qualities which eventually emerge. Experience bears this out, since defective soaking pit practice or improper period of heating, reheating and quenching, after fabrication, are reflected in weakness and failure during the adult engineering life of the steel."

Effect of Alloys on Steels

Alloying elements in general, with special reference to certain ones in particular, were then fully discussed by the speaker. He emphasized the difference between ordinary scavenging and "molecular scavenging," as illustrated in the use of vanadium in particular, which is an example of the latter. Grain growth was discussed to some extent, as well as the alloying of cast iron. High percentage alloy steels were reviewed quite extensively, with particular emphasis on the important part they will play in the future of engineering, both from a standpoint of resisting corrosion and oxidation at ordinary and high temperatures. Attention was also called to an intermediate grade of steels containing alloy elements in higher percentages than those found in structural alloy steels, though not as high as those found in non-corrosive steels of the stainless type. Some of the developments already made in this field were presented.

Present Status of Testing

The lecturer devoted considerable attention to the question of the value of testing steel, and stated that our ideas as to testing and the values of tests and their correlation to service are becoming greatly modified. The engineering profession has been accustomed to evaluate steel on the basis of standardized physical tests made on regulation test bars. While there could be no argument as to the value of physical test results for certain purposes, especially for comparison between various lots on the same type of steel, they become irrational in comparing divergent and separate types of steel. "The alloy steel industry is now some 20 years old, and if the results of testing and service experience gathered in that time be plotted on probability curves, we would gain a fairly clear picture of the respective merits of the various types of steel for a given service."

Proper Trend in Steel Research

In conclusion, Doctor Saklatwalla said that considerable interest has been aroused recently in the subject of research in steel metallurgy. It is well to bear in mind, he said, that we are concerned with steel more from the engineering standpoint than the mere treatment of steel as a chemical product. "There is a distinct differentiation between the science of metals and the science of applied metallurgy, and the work of the last 20 years or so has been directed mainly to the science of metals. Progress should be directed in the development of correlation of test and service. We have not yet developed a rational abrasion or wire test. Our knowledge of properties of steel at high temperatures is still very limited. We lack a visual representation of how steel actually fails under certain conditions and how failure progresses. The engineer and designer are limited by the materials furnished them by the metallurgist, and consequently the progress of civilization is in no mean measure dependent on him. Our progress should lie along qualitative rather than quantitative lines. As an example of new methods may be cited the development of X-ray analysis. We are not able to study as yet the high temperature changes occurring in steel by means of the hot microscope. We devote too much effort and attention to microscopic and too little to macroscopic investigation. It would certainly pay to investigate trodden fields before exploring new ones.

DISCUSSION

Dr. Ancel St. John, consulting physicist, New York, was the first of those present to discuss Doctor Saklatwalla's lecture. He called attention to the fact that some 10 years ago he had advised the use of X-rays for studying metallurgical problems, and had suggested the possibility of X-ray diffraction analysis. Since that time the methods used in attacking these metallurgical problems have been improved, and it has

been demonstrated that valuable information can be obtained by means of the X-ray without changing the metal in any respect. This method of analysis, Doctor St. John claimed, was far ahead of the microscope in the broad scope of the information obtainable. He stated that he had been examining recently sheet, brass, copper and iron up to ⅛ in. in thickness with the X-ray, in the rolled, annealed and strained condition. It had been possible, he said, to investigate practically the same area in each case, and he was glad to report that he felt that he had found out what is going on inside the metal during these various operations. Alluding to the lecturer's suggestion of the "prenatal period" in steel formation, Doctor St. John testified that he considered this very important.

The allusion of the lecturer to the prenatal, the adolescent and other periods in the development of steel was impressive, said Dr. F. N. Becket, vice-president Electro Metallurgical Co., New York. He said that it reminded him of the old saying, "Spare the rod and spoil the child," and he alluded to the possibility that, if steel is "spanked" in the prenatal, in the adolescent and in the later periods of its formation or development, it may be greatly improved. He desired to take issue with one commentator of the evening as to the impossibility of rolling high chromium products. At present, high chromium steels are being rolled down to plates and even sheets.

Complimenting Doctor Saklatwalla on the generous and broad statement which he had presented in his lecture, Dr. Paul D. Merica, director of research, International Nickel Co., New York, in alluding to the question of testing, said that our chief concern should be to give the engineer accurate information, rather than to devote too much time to the development of new products. He referred to the important progress that has been made in our knowledge of the properties of metals at high temperatures and in certain other fields of engineering steel development discussed by the lecturer.

Railroad Proposed to Link Youngstown Mills with Ohio River

Pittsburgh, Lisbon & Western, Owned by Pittsburgh Coal Co., Would Build 40-Mile Track Affording Savings on Coal and Steel Shipments

PITTSBURGH, Feb. 28.—More than ordinary interest is taken by steel manufacturers here and in Youngstown in the filing with the Interstate Commerce Commission by the Pittsburgh, Lisbon & Western Railroad of an application for permission to build 40 miles of trackage and thus provide a direct rail connection between Youngstown and the Ohio River. The Pittsburgh, Lisbon & Western Railroad is owned by the Pittsburgh Coal Co., and while the primary purpose of the proposed addition to the system is to enable the coal company to haul coal partly by water toward Youngstown and adjacent territory and effect a reduction in delivered coal costs through lower freight charges, it could be used for bringing the steel products of the Youngstown district to the river terminal and permit producers to share some of the advantages of river shipments now enjoyed by mills in Pittsburgh, Wheeling and southern Ohio.

The present line of the railroad runs from New Galilee, Pa., about 40 miles northeast of Pittsburgh, west to Lisbon, Ohio. In the construction of the new line, only four miles of the present line would be utilized, the plan calling for a 13-mile section to run from Smith's Ferry, near East Liverpool, Ohio, and Chester, W. Va., to Negley on the present line, thence west to Mill Rock, where the new line would start north 27 miles to a fork, with one branch into Struthers, Ohio, and another to a junction with the Erie Railroad at Austintown, just outside of Youngstown.

There is little doubt that Youngstown district steel companies would welcome this or some similar project that would enable them to reduce their coal costs and put them on more nearly even footing with Pittsburgh district companies able to draw their coal supplies by river. The latter are almost all within the zone where the river rate on coal is 15c. per ton from mine to plant. The present rail freight rate from Pittsburgh to Youngstown is $1.34 per ton and from the Connellsville district it is $1.42 a ton. It is believed that a combination rail and river rate of not more than $1 a ton would be possible through the building of this new line or in the working out of an arrangement whereby the existing railroads would take the coal at some point along the Ohio River and grant a proportional of the Pittsburgh through rate from that point to destination. Operated separately, with the railroad charging the local rate from the river terminal to destination, there would be little or no saving over the all rail rate.

The idea of building a road that would connect Youngstown with the Ohio River is not a new one. Several years ago an attempt was made by Youngstown steel interests to secure a traction line running in a roundabout way from Youngstown to East Liverpool, and converting it into a steam railroad with an idea of partial use of the Ohio River in the inward movement of coal and the outward movement of steel products, but nothing definite ever developed. One of the Youngstown steel companies since has been working on plans for a road that would be more direct from Youngstown to the river and in the past year there have been discussions between Youngstown steel companies and Pittsburgh coal companies having mines on or adjacent to the rivers of a plan which involved the building of a river terminal near Beaver, Pa., to which coal would be conveyed by water and then transferred to the railroads, and which might also be used as a transfer from cars to barges of down river movements of steel products from Youngstown. This plan to be successful would necessitate the cooperation of the railroads through the granting of a rate to and from Youngstown that would be a proportional part of the through rate, instead of the local rate, relatively high because of the short haul.

Shipping Board to Buy Oil Engines for Auxiliary Uses

WASHINGTON, Feb. 28.—The Shipping Board has authorized Commissioner W. S. Benson to negotiate contracts for the purchase from the Nordberg Mfg. Co., Milwaukee, of 12 two-cycle, three-cylinder, 500-bhp., air injection, internal combustion auxiliary engines at a cost not greater than $426,840. Commissioner Benson also has been authorized to negotiate for the purchase of four three-cylinder, four-cycle, 280-bhp., air injection, internal combustion auxiliary engines from the Fulton Iron Works, St. Louis, at a cost not greater than $107,232. These engines are for auxiliary equipment in the eight additional vessels the conversion of which was authorized by a Shipping Board resolution.

Exporters to Hold Convention

The eighth annual convention and dinner of the Export Managers' Club of New York, Inc., will be held March 20 at the Hotel Pennsylvania. Among the topics scheduled for discussion are new export methods, the use of aviation in expanding foreign trade, cables, radio and international telephone communication, budgetary control of export business, export sales quotas and the use of motion pictures in promoting foreign business.

The Export Managers' Club has a membership of more than 400 and the annual convention is open upon registration to anyone interested in foreign trade. The attendance at the convention last year exceeded 750.

Commercial Steel Castings Bookings and Production High in January

Orders for commercial steel castings in January totaled 90,863 tons, or 62 per cent of capacity, against 76,953 tons, or 53 per cent of capacity in December, according to reports received by the Department of Commerce from 129 concerns with a monthly capacity of 145,600 tons. Of the orders in January, 41,276 tons were for railroad specialties, representing 61 per cent of that class of capacity, compared with 39,112 tons, or 59 per cent in December. Orders for miscellaneous castings in January totaled 49,587 tons, or 63 per cent of that class of capacity, comparing with 37,841 tons, or 49 per cent, in December.

Total orders received in January made the largest tonnage since last June.

Production in January amounted to 73,886 tons, or 51 per cent of capacity, against 58,220 tons, or 40 per cent of capacity, in December. Castings for railroad specialties produced in January totaled 28,714 tons, or 43 per cent of that class of capacity, against 19,358 tons, or 29 per cent, in December. Production of miscellaneous castings in January totaled 45,172 tons, or 58 per cent of that class of capacity, as compared with 38,862 tons, or 50 per cent, in December. Total production in January was the highest for any month since last August.

By-Product Coke in January Equals Previous High Record

Production of by-product coke in January totaled 3,880,000 net tons, an increase of 234,000 tons, or 6.4 per cent, over the output in December, according to the Bureau of Mines. With the exception of March, 1927, when the reported production was the same, the January output was the highest on record. Production of beehive coke in January remained practically stationary, the total being estimated at 376,000 tons.

Automobile Production in January Gained 68½ Per Cent Over December

Production of motor vehicles in the United States increased to 225,039 in January, against 133,547 in December, according to reports received by the Department of Commerce from 161 manufacturers, 49 of whom make passenger cars and 130 make trucks, with 18 making both. Of the January output, 199,032 units were passenger cars and 26,007 were trucks, comparing with 106,079 passenger cars and 27,468 trucks in December.

Despite the gain of 68½ per cent from December, the January output was the smallest for any January since 1922. It compares with 238,926 last year, 309,544 in 1926, 240,592 in 1925, 318,526 in 1924 and 244,302 in 1923. Only five months of the preceding five years made lower figures.

Production in Canada in January was 8463 vehicles, of which 6705 were passenger cars and 1758 were trucks. This compares with a total of 3435 vehicles in December, of which 2277 were passenger cars and 1158 were trucks.

Increased Shipments of Malleable Castings

Shipments of malleable castings in January are reported by the Department of Commerce at 47,691 tons. This compares with 42,694 tons in December and 37,986 tons in November. It is, however, substantially below the shipments of January, 1927, at 49,342 tons. Figures are for 133 identical plants, of which five were idle in January.

Production of these same plants in January is given as 54,818 tons. This is the highest monthly figure since last June. It compares with 47,866 tons in December and with 51,492 tons in January, 1927.

Operation in January was at 59.6 per cent of capacity, compared with 47.6 per cent in December and with an average of 50.4 per cent for the 12 months of 1927. Capacity is on a new basis. The formula used is the "average monthly production for the best six consecutive months since Jan. 1, 1919." This places the figure at 92,015 tons, against more than 100,000 tons in each month of 1927. Hence the percentage ratios are no longer comparable.

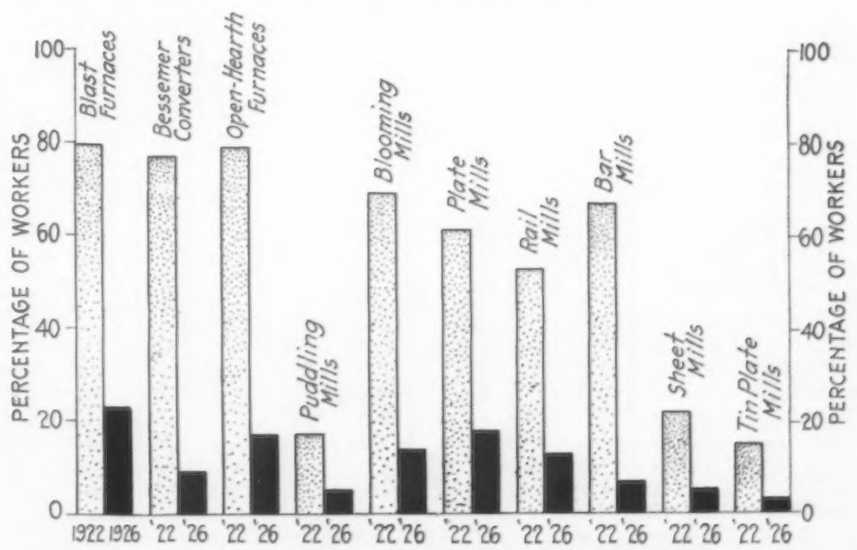
Fabricated Steel Plate Orders Lower

New orders in January for fabricated steel plate are reported by the United States Department of Commerce at 32,810 tons. This represents a drop of 8 per cent from the December figure of 35,648 tons and about the same from the figure for January, 1927, at 35,854 tons. It represented 41.1 per cent of capacity of the 51 firms reporting.

Oil storage tanks accounted in January for 8758 tons, refinery materials and equipment for 2575 tons, tank cars for 2412 tons, gas holders for 2062 tons, blast furnaces for 1225 tons and stacks and miscellaneous uses for 15,778 tons. The latter was the highest figure since last May. Blast furnace requirements made the highest total in more than a year.

Striking Reduction in Long Week in Steel Mills

CHANGES in work-week are shown in the diagram alongside. The solid black areas represent the proportion of the men, in each group designated, whose regular week in 1926 was of more than 60 hr. Contrasted with this is the dotted portion, showing the 1922 proportion on the same basis. It will be noted that there has been a sharp reduction in the long-time week for every group of iron and steel workers represented. Blast furnace operatives working more than 60 hr. have been reduced from 79 to 24 per cent, and others in similar or even greater proportions. Of the tin mill workers only 2 per cent, roughly, were working over 60 hr. in 1926. Figures are from the United States Bureau of Labor Statistics.



European Markets in Better Shape

Higher Prices and Larger Demand, Both Local and for Export —Scrap Prices Weak

(*By Cablegram*)

LONDON, ENGLAND, Feb. 27.

CLEVELAND pig iron position has been improved as a result of increasing prices of Continental iron. British iron makers are now securing better export orders. Domestic consumers have placed contracts up to June and stocks of iron are decreasing. There is talk of relighting some of the 50 Cleveland blast furnaces now idle. Hematite competition is still strong and, as stocks are still large, there is a possibility of one works closing at the end of this month.

Foreign ore deliveries are good, in spite of the Swedish strike. Hence the ironmasters are not engaging in fresh contracts.

Finished steel demand has improved in the domestic market, but export demand generally is still slow, especially in the plate department. The Admiralty has placed orders for seven destroyers with Scottish and North-East Coast yards. More locomotives have been ordered for use on British railroads.

Tin plate markets are moderately active, with inquiry in excess of actual business. Makers are well sold, on their restricted output, and prices are firm.

Galvanized sheets are active and firm. Japan has bought some parcels of black sheets—thin specifications. Other gages are in less demand and the market is quiet, but prices are higher because of the increasing cost of foreign steel.

On the Continent of Europe

Continental markets are strong. Semi-finished material is almost impossible to secure from the makers. There is good export demand for finished steel, which is being met direct by Continental makers. Hence very little important business is passing through traders' hands in London.

There is to be a meeting in Paris on March 5 of the European Rail Cartel, when, it is expected, prices will be advanced. The Raw Steel Cartel will hold a meeting shortly afterward.

BELGIAN PRICES HIGH

Mills Not Seeking Business—Slight Reaction Expected in Some Quarters

ANTWERP, BELGIUM, Feb. 11.—Recent rapid advances in the iron and steel market have developed a speculative tendency, so that, while it is generally admitted that many mills are well booked with tonnage and able to adopt an independent attitude, some reaction to the present strength would not be unexpected. Such a reaction may be only temporary, as sellers seem to be in a secure position, many either quoting prohibitive prices or refusing to consider further business at present. Since the strike in the Swedish iron mines will probably be settled shortly, this may exercise a slight depressing tendency on prices. With quotations covering a wide range depending upon the tonnage each mill has on its books, determination of the actual market is difficult.

Pig Iron.—Purchases of foundry iron have been large, and prices are very firm. Available supplies at the furnaces are small. Export prices have been advanced to £3 3s. ($15.34) per ton, f.o.b. Antwerp, for foundry grade, and basic iron is quoted at £2 19s. to £3 ($14.38 to $14.61) per ton, f.o.b. Antwerp. Bessemer hematite is quiet at 670 fr. ($18.90) per ton for domestic delivery.

Semi-Finished Material.—Prices have been advanced considerably, and less business is being transacted. Buyers are not inclined to pay the latest quotations of mills, but makers have only small supplies available and are in a position to be independent. Blooms are nominally £4 3s. 6d. to £4 6s. 6d. ($20.33 to $21.07) per ton, f.o.b. Antwerp. Billets are in good demand, but makers are not seeking business. As a result, prices

British and Continental European prices **per gross** ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.87 per £ as follows:

Durham coke, del'd.	£0	18s.	to	£0	18¼s.	$4.39	to	$4.45
Bilbao Rubio ore*...	1	1½				5.24		
Cleveland No. 1 fdy.	3	7½				16.44		
Cleveland No. 3 fdy.	3	5				15.83		
Cleveland No. 4 fdy.	3	4				15.59		
Cleveland No. 4 forge	3	3½				15.46		
Cleveland basic (nom.)	3	15	to	3	15½	18.27	to	18.39
East Coast mixed...	3	9	to	3	10	16.80	to	17.05
East Coast hematite	3	9½	to	3	10½	16.93	to	17.17
Rails, 60 lb. and up.	7	15	to	8	0	37.75	to	38.96
Billets	6	0	to	6	10	29.22	to	31.66
Ferromanganese	13	10				65.75		
Ferromanganese (export)	13	0	to	13	5	63.31	to	64.53
Sheet and tin plate bars, Welsh	5	7½	to	5	15	26.18	to	28.01
Tin plate, base box.	0	17¾	to	0	18¼	4.33	to	4.45
Black sheets, Japanese specifications	13	5	to	13	10	64.53	to	65.75
						C. per Lb.		
Ship plates	7	12½	to	8	2½	1.66	to	1.77
Boiler plates	9	2½	to	9	12½	1.98	to	2.09
Tees	8	2½	to	8	12½	1.77	to	1.99
Channels	7	7½	to	7	17½	1.60	to	1.71
Beams	7	2½	to	7	12½	1.55	to	1.66
Round bars, ¾ to 3 in.	7	5	to	7	15	1.58	to	1.69
Steel hoops	10	10	to	11	0	2.28	to	2.39
Black sheets, 24 gage	10	0	to	10	5	2.17	to	2.23
Galv. sheets, 24 gage	13	7½	to	13	10	2.91	to	2.94
Cold rolled steel strip, 20 gage, nom.	14	0	to	14	5	3.04	to	3.10

*Ex-ship, Tees, nominal.

Continental Prices, All F. O. B. Channel Ports

(Per Metric Ton)

Foundry pig iron: (a)								
Belgium	£3	4s.	to	£3	5s.	$15.58	to	$15.83
France	3	4	to	3	5	15.58	to	15.83
Luxemburg	3	4	to	3	5	15.58	to	15.83
Basic pig iron (nom.):								
Belgium	3	0	to	3	1	14.61	to	14.85
France	3	0	to	3	1	14.61	to	14.85
Luxemburg	3	0	to	3	1	14.61	to	14.85
Coke	0	18				4.39		
Billets:								
Belgium	4	13½				22.77		
France	4	13½				22.77		
Merchant bars:						C. per Lb.		
Belgium	5	7				1.18		
France	5	7				1.18		
Luxemburg	5	7				1.18		
Joists (beams):								
Belgium	4	15				1.03		
France	4	15				1.03		
Luxemburg	4	15				1.03		
Angles:								
Belgium	5	5				1.16		
⅛-in. plates:								
Belgium (a)	6	10				1.44		
Germany (a)	6	10				1.44		
⅜-in. ship plates:								
Belgium	6	5				1.39		
Luxemburg	6	5				1.39		
Sheets, heavy:								
Belgium	6	1				1.34		
Germany	6	1				1.34		

(a) Nominal.

are nominally £4 8s. to £4 11s. ($21.43 to $22.16) per ton. Makers of sheet bars are well booked with business, and, with demand large, prices are firm at about £4 12s. 6d. ($22.53) per ton, f.o.b. Antwerp.

Finished Material.—Prices show no further advance, but are decidedly strong. Buyers are unwilling to pay the present level of quotations, and mills seem to have developed an exaggerated idea of values. Steel bars are quoted at £5 5s. to £5 7s. 6d. per ton (1.16c. to 1.18c. per lb.), but some business has been closed at £5 2s. to £5 3s. 6d. per ton (1.13c. to 1.15c. per lb.), f.o.b. Antwerp. Hoops are quoted at about £6 2s. 6d. per ton (1.35c. per lb.), f.o.b. Antwerp.

JAPAN BUYS TIN PLATE

Nippon Oil Co. Places Order Here—British Export Sheet Prices Reduced

NEW YORK, Feb. 28.—Export trade continues light, and prices quoted by American mills are not particularly strong. While tin plate for export to Japan and China is quoted at about $5.20 per base box, c.i.f. Japanese or Chinese port, exporters seem to believe that with a sizable tonnage to place some concession could be obtained. The quarterly requirements of the Nippon Oil Co. in Japan, about 63,500 base boxes of oil can tin plate, have been placed with exporters in the United States. The Kioto Oil Co. in Japan is expected to enter the market shortly for 20,000 to 25,000 boxes of tin plate. Both Chinese and Japanese consumers are interested in the purchase of tin plate waste and tin plate waste waste, but are unwilling to pay the prices quoted by sellers. In some instances exporters to the Far East have been seeking to locate scrap tin plate cut from old tin cans and similar material of large size, believing that it might be used by some Far Eastern consumers and could be sold at a price within their means.

The light-gage sheet market is quiet, with American mill prices for export at $77 to $78 per ton, c.i.f. Japan or China. Recently British sellers have reduced their export prices on these specifications to £14 18s. ($72.57) per ton, c.i.f. Japan. This is only 6d. (12c.) per ton more than the recent German price of £14 17s. 6d. ($72.45). It is expected that the German quotation may be lowered to about 5s. per ton less than the British market.

Some rail business has been placed by Japanese companies. The South Manchuria Railway Co. has awarded 250 tons of splice bars to an exporter in New York for execution by an American mill and 975 tons of tie plates to a Japanese exporter for execution by a Belgian mill.

Mannesmann Works Makes Stainless Steel Tubes

HAMBURG, GERMANY, Feb. 11.—Sole license for the manufacture of seamless drawn tubes from Nirosta stainless steel, the patents on which are owned by the Friedrich Krupp A. G., has been purchased by the Mannesmann Tube Co. About 150 tons a month has been produced by the Mannesmann company for several months, but output is being greatly increased. Export orders for these tubes are reported numerous, principally from chemical plants, as long guarantees are given by the makers.

British Iron Ore Imports Increased in 1927

WASHINGTON, Feb. 27.—Imports of iron ore and manganiferous ore into the British Isles in 1927 totaled 5,091,101 gross tons, compared with 2,058,036 tons in 1926 and 4,289,988 tons in 1925, according to a report received by the iron and steel division, Department of Commerce. Of the imports last year, 74,020 tons was manganiferous ore. Increases in imports were general, except for a decline in shipments from India. The most conspicuous increases were in receipts from Spain and Algeria, the former registering an advance to 2,416,000 tons from 956,000 tons in 1926.

FRENCH MARKET STRONGER

Consumers Replenishing Stocks and Mills Are Well Booked for Two Months or More

PARIS, FRANCE, Feb. 10.—There is apparently a steady increase of confidence on the part of consumers, who are replenishing stocks in the belief that prices may show a sustained upward trend. An improvement has been evident in foreign trade also, with frequent purchases from abroad and tonnages slightly larger than for several months. An added factor of confidence is the improved market conditions in other European countries and in Great Britain. Producers are optimistic but are endeavoring to exercise moderation in advancing prices, fearing a reaction if the market increases too rapidly.

The new comptoir for the control of semi-finished material and beams seems to be thoroughly organized and prepared to function on Feb. 15. According to reports, the quotations of this new selling syndicate will not vary much from the present market level. Its relation to producers' warehouses will be similar to its position with general iron and steel merchants. Some rebates are expected to be given to warehouses, since they must carry larger stocks than contractors and other consumers.

Pig Iron.—Despite price increases on phosphoric foundry iron, improvement in business continues. Consumers are evidently using much of the iron which they are receiving, and production is increasing, largely in basic iron, as the output of foundry iron is considered sufficient to meet present requirements. On the 33,000 tons of foundry iron made available for domestic users for March, the price has been advanced 10 fr. (40c.) per ton. The General Syndicate of Northern and Northeastern Foundrymen has informed its members that, as a result of freight rate increases, prices on No. 3 phosphoric foundry will be 498 fr. ($19.57) f.o.b. Maubeuge, to 513.65 fr. ($20.10), f.o.b. Dunkirk, while it can supply them with Cleveland No. 3 foundry at 490 fr. ($19.25) per ton, delivered in the Northern region. Hematite iron is unchanged for March. Negotiations are still being carried on for the establishment of a hematite iron comptoir, and some progress is reported. For export, pig iron prices are firmer.

Semi-Finished Material.—Sellers are showing less desire for tonnage, and demand is more active. Blooms are still quiet at £4 3s. to £4 6s. 6d. ($20.21 to $21.07) per ton, f.o.b. Antwerp. Billets are moderately active at £4 7s. 6d. to £4 11s. ($21.19 to $22.16) per ton, and limited quantities of sheet bars are available at £4 11s. 6d. to £4 12s. 6d. ($22.29 to $22.53) per ton, f.o.b. Antwerp.

Finished Material.—Most mills have sufficient orders on their books to maintain a good rate of operation for two to three months, so that there is practically no inclination to shade prices, even on exceptionally desirable business. Beams are firm at £4 11s. to £4 12s. 6d. per ton (0.97c. to 0.99c. per lb.), and bars have advanced to £5 2s. 6d. to £5 3s. 6d. per ton (1.13c. to 1.15c. per lb.), f.o.b. Antwerp. The trend of sheet prices is upward.

German Steel Scrap Prices Show Weakness

HAMBURG, GERMANY, Feb. 11.—Prices of iron and steel scrap have declined somewhat, so that shipments from the United States and Great Britain may not prove so profitable as in the latter part of last year. In the closing months of 1927 9170 tons of scrap from the United States arrived in Germany. At present, however, consumers have almost entirely ceased purchasing, and the scrap dealers, who were formerly in a single association, have divided into two organizations, which are competing for business. As consignments are often shipped to Germany from the United States and Britain for sale at the market price on arrival, this downward movement in prices may cause some losses to sellers.

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This Issue in Brief

Greatest bulwark against foreign competition is American inventive genius and capacity for organization, says Department of Commerce executive. The bogie will fade as we mobilize our resources and collective energies for the best interests of our industries.—Page 608.

Manufacturers may soon receive "educational orders" for munitions. A bill before Congress provides for authority to be given War Department to place orders with manufacturers selected as being best qualified to furnish supplies during emergency.—Page 587.

Safety code for forge hammer operators has been issued by Department of Labor. Trade associations have approved the code and recommended that it be posted in every plant operating forging and hot-metal stamping hammers.—Page 593.

Costly repairs avoided by installing a permanent hearth in blast furnace. Hearth made of heavy cast iron sections, bound together with wrought iron bands, has been in use 11 years and is still in perfect condition.—Page 594.

Reduction in the cost of producing steel is promised by the proper application of washed blast furnace gas, says engineer. This is the most important single unrealized means, he declares, adding that the present simplest and cheapest of the thoroughly tried Continental systems is wet cleaning by the disintegrator method. — Page 595.

New hardness tester employs a pyramid diamond indenter, which is pressed into the specimen under a low load. For hard metals it is said to be superior, and is applicable to finished work and to very thin sheets. Two hundred accurate tests an hour are claimed for it. —Page 602.

Early improvement in business is forecast by favorable barometers, says Dr. Haney. Trend of employment took on a more promising aspect in January; money is easy, and the P-V Line is ascending.—Page 610.

What qualities determine the usefulness of gray iron castings? A. F. A. committee proposes to answer this question by formulating a series of specific problems, and employing the solutions to help remove the difficulties confronting the gray iron industry.—Page 598.

Foresees at least four to six months of above-normal business for steel industry. Prospects are sufficiently favorable to warrant anticipation of good business at least until July, Dr. Haney indicates.—Page 611.

You will gain by concentrating your production and sales efforts on simplified lines, i. e., items in most demand, says Department of Commerce official. The "simplified" lines are more economical to make and easier to sell.—Page 608.

Cuts cost of making malleable castings by installing powdered coal equipment. Quicker heat and hotter metal are obtained. Furnace labor costs are reduced, and refractory costs are lowered slightly.—Page 600.

Though automobile output gained 68 per cent in January over December, it was still the smallest first month since 1922. The number of vehicles produced was 225,039, as against 133,547 in December. — Page 615.

Failures of steel in service may be reduced by investigation to determine the amount of iron oxide that will dissolve in iron under various conditions. Failures in a great many cases are due to non-metallic inclusions, the basis of most of which is dissolved iron oxide.—Page 596.

Heat treatment a measure of a nation's civilization, says metallurgist. At one time it was said that the amount of sulphuric acid consumed was the yardstick. Later steel scrap production was suggested as a truer criterion. Now a new measure, the tonnage of metal heat treated, may be set up.—Page 613.

Limestone produces cleaner steel, says open-hearth man. Burnt lime gives faster heat but, because of the larger boil, limestone gives cleaner metal.—Page 595.

Is "profitless prosperity" due to scientific methods of production vs. unscientific methods of selling? Industry is turning out a continually increasing volume of goods at a gradually decreasing manufacturing cost. But the selling departments of the industries apparently are blind to the fact that there is a limit to the amount of staple commodities the country can absorb, and that consumption will be stimulated little by price cutting.—Page 620.

"Tool room" precision and carefulness are employed in airplane engine manufacture. Parts are checked and tested after each operation in the making of Wright "Whirlwind" motors.—Page 590.

Don't neglect the present metals in the desire to develop new products, engineer tells metallurgists. There is a great deal to be discovered about the metals we now have, and the use made of those metals by engineers is limited to the information about them which metallurgists provide. — Page 614.

Sharp gain in pig iron output is indicated by telegraphed returns. Estimated daily production for February was 99,640 tons, a gain of 7067 tons per day, or 7.6 per cent, over January.—Page 623.

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Overproduction, a Waiting Game

REPRESENTATIVES of three industries, one, (zinc) on the road to depression, another (coal) in the very slough of despond, and a third (copper), which is finding the way out, met during the Mining Engineers' convention in New York last week to discuss the problem of overproduction in industry. The resulting picture reflected many aspects of general industrial conditions throughout the United States.

"Profitless prosperity" has been blamed upon many things. Speaking in general terms we believe it is mainly due to widespread adoption of scientific methods of production, unaccompanied by any systematic improvement in the matter of distribution and selling. It results that present plants and labor forces are turning out a continually increasing volume of finished goods at a gradually decreasing manufacturing cost. However, the selling departments of the industries generally have not yet awakened to the fact that there is a limit to the amount of staple commodities which can be absorbed by the population of this country; that such a large cut in the selling price as to wipe out all profit will not stimulate consumption to any great extent, or contrariwise that the concerted maintenance of selling price on a profitable basis will not cause any material reduction in the amount purchased. Saturation is being approached in many raw materials, semi-finished manufactures and labor-saving equipment.

These general propositions, if accepted, contain within them some indications of the corrective steps to be taken. Great expansion in productive capacity must be accepted as a fact. Even further expansion is in prospect. Harrington Emerson calculates that, when all available human effort is placed at supervising machinery, the hours of labor could be cut 30 per cent; yet production would be twice as much as today. Regardless of the precision of this estimate, the long view ahead would discern increasing mechanization and shorter work days.

Shorter work days mean more time for the ultimate consumer to utilize and enjoy the various products which will be devised and which he will make. Such has been the trend of the last 20 years. The making of automobiles, highways and electrical devices (telephones, radio, home conveniences) has absorbed most of the additional productivity our population has achieved during those years. The using of these things has been general because during the same years the scale of living and the amount of leisure has increased to the extent that citizens generally can enjoy the new luxuries and conveniences.

Thus, while research in the past has largely been confined to the problem of making things more easily, and to making new things, research in the future must pay more attention to finding new uses for the old things, to finding new and useful things to make, to devising ways and means so the ordinary citizen can acquire and enjoy more of these new things. Thus, general expansion of consumptive capacity must match the general increase in productive efficiency.

Zinc reflects some of these general considerations. A small proportion of by-product metal, acquired at low cost, dominates the market. It is a sudden source of production. It has placed the industry in the position of being able to produce far more than it can sell. Without building any more smelters, the industry suddenly has all the earmarks of overexpansion. What is to be done? The highest cost producers will have to quit. The rest will have to realize that it is a waiting game until new things can be devised to absorb the available zinc. Meanwhile "live and let live." It will do nobody much good, and the whole industry much harm, to grab a lion's share of the available business by price concessions. They will not increase actual consumption enough to warrant them.

Coal never has learned these lessons. Whereas the consumption used to increase 10 per cent a year, it has dropped to 2 per cent, not because the country's demand for power has lagged, but because more power is coming from other sources—oil, gas or electricity. Meanwhile coal has become over-expanded to where it will take 50 years to catch up. As it has been plaintively expressed, to correct the situation a number of mines and miners

must die for the good of the cause; that is, accept their losses and turn their efforts to other things. The quicker the better; 50 years is too long to wait. Meanwhile, the industry must learn that it can sell no coal below cost, nor ship coal until it is sold.

Copper proves these general propositions. It was greatly over-expanded in 1920, both by enlarged plant and improved metallurgical extraction. With the war demand cut off, the future seemed almost as black as the coal situation. But a general and adequate curtailment of operations enabled all but the weakest operations to survive until the consumptive demand increased. More and more electric equipment required copper. Concerted and vigorous publicity and sales promotion regained a lost market in the building industry. A general improvement in living conditions enabled the ultimate consumer to buy more brass and copper fixtures, hardware and utensils. In short, copper found the way out by its sales managers' realizing that price slashing wouldn't expand the market. On the other hand, they united in a constructive effort to find new outlets, and waited for the expanding market, which is only a matter of time.

Cold Facts About Coal

A SENATORIAL investigation of the soft coal strike in western Pennsylvania, West Virginia and Ohio is under way. Since any correction of the conditions prompting the investigation will come through public opinion, rather than senatorial pronouncements, it is highly important that the record shall run to fact rather than sentiment.

The sympathy of the public no doubt will be aroused by testimony as to the suffering of idle miners and their families; but the public will need to know the facts to decide who is responsible for the suffering. For the past thirty years, or since the mine owners in Pennsylvania, Ohio, Indiana and Illinois, known as the central competitive field, made the mistake of granting the union check-off, the union has not been obliged to solicit membership. The hope was that with the funds so collected the union would be able to organize the Southern fields and thus establish a common wage scale for all districts. A man taking employment in a union mine automatically became a union miner, since his first pay envelope was tapped for initiation and dues by the company, the money being turned over to the union. The union leaders lost sight of the man, his living and the education of his children in the sole endeavor to unionize the mines, not those who work in them. Mine owners have been equally out of touch with the individual miner, it being such a simple matter, when men were wanted, to ask the union to furnish them.

The committee will not have to prod witnesses to get testimony to the ruthlessness of operators in this latest struggle, but it is to be hoped the reasons why the union has not performed the chief of its covenanted functions—the care of the men while out on strike—will be fully developed. There are supposed to be 400,000 union miners subject to dues, fines and assessments when at work. It would help the formation of just opinion of the situation if it could be shown what the union receipts have been and how they have been disbursed. The proper handling of the money, it would appear, should have made unnecessary an appeal to the public for help. Working miners are reported to have paid an average of $40 annually in dues, assessments and fines in recent years. Thus assuming only 50 per cent employment in the period of the Jacksonville wage scale from April 1, 1924, to April 1, 1927, there is an indicated income for the union of $24,000,000. The harshness of winter evictions from coal company houses cannot be gainsaid. On the other hand there will be testimony to the ignoring of repeated orders to leave, given in seasons of pleasant weather.

There are few so sanguine as to believe the hearing will produce valuable results. Pittsburgh district coal operators are definitely through with the union, particularly the steel companies which have ceased making contracts that were subject to suspension when any disagreement arose between owners of commercial mines and the union.

Such steel companies produce coal for their own use and not for sale, and the coal mine has its definite place as a steel-making factor. Moreover, it is a matter of calculation that the cost of stocking coal in preparation for possible shortages due to strikes has added a dollar a ton to the cost of making ingots. This extra cost comes in handling charges, interest on money tied up, and the care that must be taken to prevent the piles from burning through spontaneous combustion. That is a burden which the steel industry least of all can carry, with its well known limitations of prices and profits.

Steel Tonnage Prospects

THERE has been a tendency to overrate the importance of recent changes in steel tonnage prospects, which after all have been slight. Shortly before and after the first of the year there were notions that steel demand in 1928 would be exceptionally heavy. On the other hand, the trend toward conservatism in the past few weeks has produced a batch of less favorable expectations.

Such magnifying of small things distorts the picture, the important feature of which is really the steadiness of steel demand. There have been five years of high production of steel, with a uniformity of rate never even closely approached in the past for more than three years, and then only once, from late in 1904 to late in 1907. Gaged by steel ingot production, the slightly "off" year 1924 was 16 per cent under the five-year average, and every other year was just a trifle above, except 1926, which was 7 per cent above.

The idea used to prevail rather generally that good years in steel were naturally and necessarily to be followed by poor years. That idea must be abandoned or held very far in abeyance, for if it were to be applied it should have been applied at least two years ago, and there have since been two heavy years to indicate its errancy.

It is logical and practical to assume that after a reasonable time a continuance of a given volume of steel demand furnishes increased guarantee for its continuance. As the country grows it is easier to maintain a given rate.

In specific detail there has been no important steel consuming line that promised materially more or materially less steel consumption this year than last, with the exception of the automobile industry.

Detailed reports by steel producers for the annual presentation by THE IRON AGE of where steel went have assigned 13 per cent of the steel to the automotive trade in 1925, 14½ per cent in 1926 and 14 per cent in 1927. Thus a change of one-third in automotive production represents less than 5 per cent of the total steel production. Recently revised reports of the Department of Commerce of fabricated structural steel lettings in the past three years show the lowest year of the three, 1926, to have been only 3 per cent below the three-year average, and the highest year, 1927, only 2.5 per cent above the average. Last year oil and gas field consumption of steel was regarded as being very much "off," but our reports indicated a very fair consumption, and the more rational view is that it was rather 1926 that was "off," in the other direction.

Prices secured by mills for their output of steel this year will be determined by the attitude of the sellers rather than by the tonnage, which is altogether unlikely to show any material decrease, or such an increase as would of itself affect prices. In the first quarter of last year production of steel ingots represented 85 per cent of capacity, while the year's average was 75 per cent. The present quarter promises no material divergence from the corresponding quarter of 1927. There is more leeway in individual finished steel lines than in ingot production, because the total finishing capacity exceeds the ingot capacity. Two or three finishing lines may run above the general average and yet be under no strain.

CORRESPONDENCE

Equipment and Competition

To the Editor: Inferences might be drawn from the advertisements and articles appearing in your columns that there would be no difficulty in meeting the existing horrible competition with modern equipment.

We have always experienced instances of price-cutting, but never to the present extent, which borders on desperation. No one is exempt from the effects. A neighboring company, which is the largest of its kind in the country, is suffering from this cut-throat practice. Some of its best lines have been copied by smaller companies of no reputation, and the price of its stock has dropped from above 90 to between 50 and 60. On an inquiry from a dealer we recently quoted 30c. a set on one of its articles, weighing 1¼ lb., which was made of gray iron, machined, japanned and polished, and found that it was being bought for 15c.

We lately figured on some screw machine parts, and the mill made us a special price on the material. The order was placed at just the cost of the stock, with no allowance for machine work or overhead, to say nothing of profit. It would require a more modern machine than has yet been created to make it possible to meet these conditions.

I. S. SPENCER'S SONS, INC.

Guilford, Conn.

Art of Competition Calls for Study

To the Editor: Magnus W. Alexander stated a good many of the problems of present-day competition in his Detroit speech, as reported in THE IRON AGE of Jan. 26. He pointed the way to a solution, with perhaps no intention of indicating just how the solution is to be carried out. Holding up the "deficiteer" to scorn, with the implication that he ought to be eliminated, seems to be the thought which is uppermost in Mr. Alexander's mind.

However, the best way we know at present of beating competition is to get orders instead of having the competition get them. And there is a lot to be learned out in the highways and byways of trade about that simple art.

On a recent investigation of competitive conditions in a number of competitive organizations, the writer learned some very interesting facts. They are tabulated herewith:

1. Few competitive organizations have very definite ideas about what business they really want to get.
2. In eight organizations out of 11 there was no precise information on where such business as it was claimed was wanted could be found.
3. In seven organizations out of 11 there was no clean-cut plan of getting the business which it was claimed was wanted, in spite of the competition.
4. In only one organization out of 11 had the competitive force been built on a careful study of what the prospective customer wanted. Ten out of 11 were trying to sell what they could conveniently make rather than what the prospective customer wanted.

The investigation covered tank and boiler shops, equipment and machinery builders. It must not be inferred that the information acquired in the case of these 11 organizations is applicable to any organizations other than these particular 11 which were visited. Such conditions *might* be true in a good many industries. It is entirely too easy to generalize from a few facts.

Suppose everyone who is really in a severely competitive market were to make a study of the art of competition. It is actually one of the oldest forms of human activity. Let everyone so afflicted find out all there is to be known about how competitive struggles are won, how to conduct such a struggle, what the chances are for success, etc. It is the writer's belief that a great deal of the futile competitive effort would be eliminated, not by some outside agency, but by the very perpetrators of such activity. The general theory back of the suggestion is the same as the theory which would lead us to conclude that, if an ordinary business man of violent temper would make a study of prize fighting, he would not climb into the ring with the well known Mr. Tunney. Mr. Tunney is not only physically able to fight, *but he knows how to fight.*

ROBERT E. KINKEAD,
Consulting Engineer.

Cleveland, Feb. 2.

Tool Steels, Small Tools and Other Supplies Exhibited at Bridgeport

A cooperative exhibit held under the auspices of the Salesmen's and Purchasing Agent's Association at the Pyramid Mosque, Bridgeport, Conn., was well attended. There were more than 80 exhibitors, and the displays included representative lines of small tools, tool and die steels, non-ferrous products, plating equipment, electrical apparatus, belting and other factory supplies. The attendance was from a comparatively wide area.

Cooperating organizations included the Manufacturers Association of Bridgeport and the Chamber of Commerce. Officers of the Salesmen's and Purchasing Agent's Association are: H. J. Behn, Hunter & Havens, president; A. H. Jones, Bryant Electric Co., vice-president; W. B. Osborne, Bussman Mfg. Co., secretary; and R. T. Phipps, Bullard Machine Tool Co., treasurer, all of Bridgeport.

Articles of Agreement for Flat Rolled Steel Association Completed

PITTSBURGH, Feb. 27.—G. H. Charls, E. T. Sproull and A. N. Flora, who are to be active executives of the National Association of Flat Rolled Steel Manufacturers have completed the articles of agreement whereby the National Association of Sheet and Tin Plate Manufacturers, the Hot-Rolled Strip Steel Institute and the Cold-Rolled Strip Steel Institute become one organization, and there now remains merely the ratification of the plan by the three organizations to make the merger effective.

February Iron Output Gains Decidedly

Estimates, Collected by Wire, Make Daily Rate 7067 Tons or 7.6 Per Cent More Than January—Net Gain of One Furnace

ESTIMATES of the February pig iron production, gathered by wire on Tuesday, Feb. 28, reveal a decided increase over January. Producing companies estimated the output for the last two or three days and calculations for only two companies were made in this office. The production of coke pig iron last month was approximately 2,889,500 gross tons or 99,640 tons per day for the 29 days. This compares with an actual production of 2,869,761 tons or 92,573 tons per day in January. The February increase therefore is 7067 tons per day or 7.6 per cent.

These preliminary returns indicate that there was a net gain for the month of only one furnace—six were blown in and five were shut down—making the number operating at the end of the month 186. The gain was all in steel-making furnaces. The Steel Corporation blew in six and blew out one furnace. Two independent steel companies and two merchant stacks were shut down. Thus the net gain was three furnaces for the steel-making companies, six blown in and three blown out.

Actual data for the February output will be published in THE IRON AGE, March 8. The table gives the estimated production by districts for February and the actual output for the three preceding months.

Pig Iron Production by Districts, Gross Tons

	Feb. (29 days)	Jan. (31 days)	Dec. (31 days)	Nov. (30 days)
New York and Mass.	203,800	203,715	199,726	212,778
Lehigh Valley	75,700	72,639	74,316	75,748
Schuylkill Valley	43,900	43,946	44,238	53,269
Lower Susq. and Lebanon Valleys	29,000	30,338	32,289	30,150
Pittsburgh district	598,100	582,497	523,875	495,005
Shenango Valley	87,900	77,023	58,982	64,752
Western Penna.	86,800	89,372	92,774	92,000
Maryland, Virginia and Kentucky	89,300	94,590	92,981	91,300
Wheeling district	118,200	108,188	114,030	110,055
Mahoning Valley	260,500	247,371	222,572	223,617
Central and Northern Ohio	294,100	313,697	295,179	306,395
Southern Ohio	25,300	32,480	32,413	32,750
Illinois and Indiana	637,800	608,771	537,892	508,545
Mich., Minn., Mo., Wis., Colo. and Utah	131,500	134,718	140,141	126,287
Alabama	202,800	224,132	227,775	219,478
Tennessee	4,800	6,284	6,572	6,247
Total	2,889,500	2,869,761	2,695,755	2,648,376

EMPIRE OFFICERS NAMED

New Sheet Company, Formed by Merger of Six Ohio Mills Completes Organization

The Empire Steel Corporation, Mansfield, Ohio, completed its organization the past week and unified control of the six Ohio sheet mill plants that have been merged will become effective March 1. The companies merged include the Mansfield Sheet & Tin Plate Co., Mansfield; the Ashtabula Steel Sheet Co., Ashtabula; the Empire Steel Co., Cleveland; the Falcon Steel Co., Waddell Steel Co. and the Thomas Sheet Steel Co., Niles.

W. H. DAVEY

The selection of W. H. Davey, president of the Mansfield company, as president of the new company, was previously announced. Other officers have been chosen as follows: Vice-president, J. D. Waddell, president Waddell company; treasurer, W. R. Jenkins, secretary Mansfield company; secretary and director of purchases, A. I. Davey, vice-president Mansfield company; general manager, Samuel Davey, second vice-president and general manager Mansfield company. The executive committee consists of H. S. Pickands, Pickands, Mather & Co., Cleveland; W. A. Thomas, one of the owners of the Thomas Sheet Steel Co., and Mr. Waddell, Mr. Jenkins, W. H. Davey and A. I. Davey. Finances will be in charge of a special committee consisting of W. H. and Samuel Davey, C. S. Thomas, former chairman of the board of the Thomas company; A. H. Wheatley, president Empire Steel Co., and Paul Wick, vice-president Falcon company. The executive and sales headquarters will be at Mansfield. Branch sales offices will be located in Detroit, Cleveland, New York, Philadelphia and Chicago.

The Empire company will have at its Mansfield plant open-hearth capacity for about one-half of its sheet bar requirements and will purchase the remainder, about 200,000 tons a year, in the open market. The products of the six mills will include all grades of sheets except galvanized. However, it is planned to convert one of its buildings into a plant for manufacturing galvanized sheets.

W. H. Davey, president of the new company, who took a leading part in bringing about the merger, has been prominently identified with the sheet steel industry for many years. He was vice-president and general manager of the Massillon Rolling Mill Co., Massillon, for some time, and was one of the organizers in 1914 of the Central Steel Co., Massillon, the two companies later being combined. In that year he went with the National Rolling Mill Co. at Mansfield as president, and reorganized it as the Mansfield Sheet & Tin Plate Co. He continued as president and treasurer of this company. Mr. Davey gained his first experience in the steel industry in Gloucester, England, with the Hawkwell Tin Plate Works, where he became a heater. Coming to this country, he was employed by the United States Iron & Tin Plate Mfg. Co., McKeesport, Pa., now the McKeesport Tin Plate Co., and became mill superintendent of the latter company. Later he was general superintendent of the McClure Tin Plate Co., Washington, Pa., now the Washington Tin Plate Co., Before going to Massillon he was superintendent of the Carnaham Tin Plate Co., Canton. Mr. Davey has had five brothers associated with him in the operation of the Mansfield plant, two of whom are officers in the new company.

C. H. Stamm has been appointed general sales manager and manager of service of the Empire Steel Corporation. He had been in charge of service for the Mansfield Sheet & Tin Plate Co., having been connected with that company since its organization in 1915. Previously he was with the Carnahan Tin Plate

(*Concluded on page* 642)

Iron and Steel Markets

Sharp Increase in Pig Iron Output

Month, However, Shows Net Gain of Only One Active Furnace—Advance in Plates, Shapes and Bars Drives in Business at Previous Price—Automobile Production Expands

AGAIN of 7.6 per cent in pig iron production in February, as indicated by estimates telegraphed to THE IRON AGE, compares with an increase of 6.4 per cent reported in the previous month. Analysis of the returns, however, shows that there was only one more furnace in blast at the close of the month than on Feb. 1, as against a gain of 16 furnaces in January.

There was an actual decline in the number of merchant furnaces and in independent steel company stacks, the Steel Corporation alone accounting for the increase. That company blew in six furnaces in February and shut down one, while the four other stacks put out were evenly divided between independent steel makers and producers of merchant iron. Although the daily rate of pig iron production for the month, at 99,640 tons, is the largest since June, 1927, it is the smallest for any February since 1922.

The blast furnace returns give fresh emphasis to the uneven character of the recent improvement in business. Increased pig iron requirements have been preponderantly for steel-making purposes, and the gain in steel works operations has been heavier in Steel Corporation than in independent plants.

Territorially, also, conflicting tendencies in the steel market are becoming more sharply defined. Activity is most pronounced in the Chicago district, where specifications still exceed shipments and production has been pushed up from 93 to 95 per cent of capacity. In Ohio, where the bulk of current tonnage is coming from the automotive industry, shipping orders are also in good volume, although total specifications for the month were slightly smaller than in January. The market situation is less favorable at points east of Cleveland, being quietest on the Eastern seaboard, where specifications against first quarter contracts continue to lag and little new business has appeared.

From the standpoint of commodities likewise a uniform market trend is lacking. The recent gain in mill operations is to a large extent attributable to bookings in the heavier rolled products. The second advance since Jan. 1 in plates, shapes and bars, announced last week by the Steel Corporation —putting prices up $1 a ton to 1.90c., Pittsburgh, and proportionately higher levels at other basing points—has been followed by most mills. The principal immediate effect of this price increase was to cause buyers to cover their forward needs, in some cases well through the second quarter, at the previous price, or 1.85c., Pittsburgh. This figure, however, represents a $2 a ton advance over the price at which consumers specified so heavily in December. Cold-rolled strip is also showing signs of strength, with mills booking sizable tonnages for second quarter at an advance of $3 a ton above prices ruling on first quarter shipments.

For other products higher prices are still largely untested. Some business in automobile body sheets has been taken for April shipment at 4.15c., but there has been little second quarter contracting. Current orders for galvanized and black sheets, notably at Cleveland and Philadelphia, have brought out concessions of $2 or more per ton. Even on sheet contracts that have been closed for next quarter the firmness of prices will not be disclosed until the time comes for specifying.

One cause for concern in sheets, as well as in wire nails and some other commodities, is the heavy commitments made at lower prices. It is pointed out that jobbers in sheets and nails who covered at low figures are now in a position to meet or even underquote current mill prices. To what extent the generous purchases that preceded price advances anticipated forward requirements is still an unanswered question. It is believed, however, that unfilled orders of leading steel companies, as of March 1, will show little increase, and possibly a decline.

Steel production, as a whole, continues to hold its recent gains, and the operations of Steel Corporation plants are unchanged at 90 per cent of capacity for the third consecutive week. The chief hope for a further expansion in demand lies with the automobile industry. Makers of cheaper motor cars, with the exception of the Ford Motor Co., are operating at a high rate. The March schedule of the Chevrolet Motor Co. calls for 127,000 units, as compared with 72,000 in November. Employment in Detroit shows a gain of 13,500 as compared with a year ago.

Structural work is enlarged by inquiries for 24,000 tons, including 8000 tons for a garage in Chicago, and awards in the week were about 22,000 tons.

The Chicago, Milwaukee, St. Paul & Pacific Railroad has inquired for 4650 freight cars, the Pacific Fruit Express has ordered 2000 refrigerator cars and the Fruit Growers Express will buy 1200 steel underframes for cars. The Union Pacific has bought 23 locomotives.

The 1928 Lake Superior iron ore season has opened with an inquiry from the Ford Motor Co. for 443,000 tons, about 10 per cent more than this company bought last year.

Buying of pig iron, principally for second quarter, continues fairly active at Cleveland, where sales were 37,000 tons, and at Chicago, where the total was 35,000 tons. In Eastern markets there is less activity, but 15,000 tons was sold in the New York district.

Exports of iron and steel products in January were 205,766 gross tons, the highest total since January, 1927. Imports declined to 58,635 tons from 64,188 tons in December.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 28, 1928	Feb. 20, 1928	Jan. 31, 1928	Mar. 1, 1927
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.26	$21.76
No. 2, Valley furnace	17.25	17.25	17.25	18.50
No. 2, Southern, Cin'ti	19.69	19.69	19.69	21.69
No. 2, Birmingham	16.00	16.00	16.00	18.00
No. 2 foundry, Chicago*	18.50	18.50	18.50	20.00
Basic, del'd eastern Pa	19.50	19.50	19.50	21.00
Basic, Valley furnace	17.00	17.00	17.00	18.00
Valley Bessemer, del. P'gh	19.26	19.26	19.26	20.76
Malleable, Chicago*	18.50	18.50	18.50	20.00
Malleable, Valley	17.25	17.25	17.25	18.50
Gray forge, Pittsburgh	18.51	18.51	18.51	19.76
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, Seaboard	100.00	100.00	100.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. billets, Pittsburgh	33.00	33.00	33.00	34.00
O.-h. sheet bars, P'gh	34.00	34.00	34.00	34.00
Forging billets, P'gh	38.00	38.00	38.00	40.00
O.-h. billets, Phila	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh	44.00	44.00	42.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.80	1.90
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.12
Iron bars, Chicago	1.90	1.90	1.90	2.00
Steel bars, Pittsburgh	1.85	1.85	1.85	1.90
Steel bars, Chicago	1.95	1.95	1.95	2.00
Steel bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.85	1.85	1.85	1.85
Tank plates, Chicago	1.95	1.95	1.95	2.00
Tank plates, New York	2.17½	2.17½	2.17½	2.19
Beams, Pittsburgh	1.85	1.85	1.85	1.90
Beams, Chicago	1.95	1.95	1.95	2.00
Beams, New York	2.14½	2.14½	2.14½	2.19
Steel hoops, Pittsburgh	2.20	2.20	2.20	2.30

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Sheets, Nails and Wire,	Feb. 28, 1928	Feb. 20, 1928	Jan. 31, 1928	Mar. 1, 1927
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	2.90	2.90	2.80	2.75
Sheets, black, No. 24, Chicago dist. mill	3.00	3.00	3.00	2.95
Sheets, galv., No. 24, P'gh	3.65	3.65	3.65	3.65
Sheets, galv. No. 24, Chicago dist. mill	3.85	3.85	3.85	3.85
Sheets, blue, 9 & 10, P'gh	2.10	2.10	2.10	2.20
Sheets, blue, 9 & 10, Chicago dist. mill	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	2.65	2.65	2.55	2.55
Wire nails, Chicago dist. mill	2.70	2.70	2.60	2.60
Plain wire, Pittsburgh	2.50	2.50	2.40	2.40
Plain wire, Chicago dist. mill	2.55	2.55	2.45	2.45
Barbed wire, galv., P'gh	3.35	3.35	3.25	3.25
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.25	3.30
Tin plate, 100 lb. box, P'gh	$5.25	$5.25	$5.25	$5.50
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$14.75*	$15.00	$14.75	$16.00
Heavy melting steel, Phila	13.50	13.50	13.50	14.50
Heavy melting steel, Ch'go	*12.75*	13.00	12.50	12.75
Carwheels, Chicago	14.00	14.00	14.00	15.00
Carwheels, Philadelphia	15.50	15.50	15.50	16.00
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.75
No. 1 cast, Philadelphia	16.00	16.00	16.00	17.00
No. 1 cast, Ch'go (net ton)	14.50	14.50	14.50	16.50
No. 1 RR. wrot. Phila	15.00	15.00	15.25	17.00
No. 1 RR. wrot. Ch'go (net)	*11.00*	11.50	11.00	12.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.60*	$2.75	$2.60	$3.50
Foundry coke, prompt	3.75	3.75	3.75	4.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*14.20*	14.25	14.25	13.50
Electrolytic copper, refinery	*13.75*	13.82½	13.87½	13.12½
Zinc, St. Louis	*5.45*	5.47½	5.67½	6.82½
Zinc, New York	*5.80*	5.82½	6.02½	7.17½
Lead, St. Louis	*5.90*	6.07½	6.30	7.32½
Lead, New York	*6.15*	6.32½	6.50	7.40
Tin (Straits), New York	**51.75**	51.50	54.62½	69.62½
Antimony (Asiatic), N. Y.	*10.25*	10.87½	11.25	13.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Production and Shipments of Steel Holding Up—$1 Advance on Heavy Tonnage Products

PITTSBURGH, Feb. 28.—The production and movement of steel are holding up to the recent rate, with the automotive industry showing particular urgency in getting supplies and a high rate of activity is noted among those serving that industry. The steel requirements for building and construction and for standard-section rails also are contributing in an important way to the maintenance of an 80 per cent operation of steel-making capacity and to some extent the agricultural implement industry is helping the production of this and nearby districts. Other major consuming sources are below the average, this being particularly true of pipe for the oil industry. The situation would be rounded out with a better distribution of the production, but the essential thing is that the industry is making a satisfactory showing as to volume. Some of the extreme cheerfulness of the early weeks of the year has passed, as the trade reviews the experiences of the first two months and takes cognizance of the fact that general business is not measuring up to some expectations.

The advance on bars, plates and shapes of $1 per ton last week by the leading producer, and since adopted by others, is being watched very closely by manufacturers for its reaction among the consumers. In view of the fact that tonnage buyers were given opportunity to add to their commitments and as they were already covered to the end of this quarter, it is obvious that a good deal of second quarter tonnage will be shipped at not over 1.85c. While steel manufacturers are desirous of getting more profitable prices, they are not overlooking the possibility that too stiff an advance might bring price resistance. Something has been accomplished by last week's advance, however, seeing that manufacturers have definitely established the second quarter price at 1.85c., as against 1.80c., the ruling contract price for this quarter.

Some contracts for second quarter in sheets and strips are being written at the higher prices recently announced, but the proof of the firmness of makers will hardly be demonstrated until the time comes for specifications on these contracts. There was, as has been pointed out from time to time, so much coverage for this quarter at lower prices that the advances could not become immediately effective. Jobber competition with mills on nails and sheets has been made possible through the fact that jobbers covered at low prices and now can resell profitably at current mill quotations or less.

Primary materials still are very dull. Interest has rarely been lower in pig iron. Scrap dealers point out that their sales are smaller with the steel industry producing ingots at 80 per cent of capacity than they were when the steel output was lower. The fuel situation is as depressed as ever, because even the production formerly rated as light is more than ample for requirements.

Pig Iron.—Business still drags and there is nothing to encourage ideas of early improvement because of the fact that important melters quite generally have stocks or protection against their requirements for the next month or two, and some for an even longer period.

Shipments are steady and in good volume and, since consumers are not stocking to any great extent, the natural conclusion is that the melt is increasing. Steel foundries in the district are having a better operation than they had over the latter part of last year, but are not so busy that they could not take on more business. Gray iron foundries still are operating at a rather low rate, but the sanitary ware and radiator companies appear to be doing well. Current sales of all grades run largely to single carloads at unchanged prices. The Westinghouse Electric & Mfg. Co. inquiry is still open; there is an impression that the business will be awarded upon a reciprocity basis.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$17.00
Bessemer	17.50
Gray forge	16.75
No. 2 foundry	17.25
No. 3 foundry	16.75
Malleable	$17.25 to 17.50
Low phosphorus, copper free	27.00

Freight rate to the Pittsburgh or Cleveland district, $1.76.

Ferroalloys.—Sustained operations of steel works is responsible for a steady flow of specifications for the commonly-used ferroalloys. New business amounts to little, since so few consumers failed to contract for supplies. Prices are unchanged.

Semi-Finished Steel.—There is a good movement of billets, slabs and sheet bars, but no activity in the market apart from the specifications of non-integrated makers of sheets, tin plate and strips. Makers of wire rods are all quoting $44, base Pittsburgh or Cleveland, but sales at that price are few and small.

Bars, Plates and Shapes.—The advance of $1 a ton announced last week by the Carnegie Steel Co., putting these products to 1.90c., base Pittsburgh, since has been adopted by other producers, but in most cases it seems to have been preceded by a good deal of covering of buyers through the second quarter at the old price and not much business has been written at the higher figure. The makers of these products are desirous of getting prices to a profitable basis, but at the same time are aiming to create a minimum of price resistance. An interesting feature of the latest announcement by the Carnegie Steel Co. is the reference to the fact that for small lots there is an extra of $2 a ton. The last previous announcement, Jan. 19, last, contained no reference to small-lot prices. A good deal of plate business is in sight in river barges, but structural steel fabricators are not figuring on as much business as they could handle. Activity in cold-finished steel bars is reflected in the specifications for hot-rolled bars.

Rails and Track Supplies.—Business still is slow in track accessories, railroads apparently waiting on weather sufficiently open for rail-laying before ordering spikes, tie plates, etc. The local maker of standard-section rails is well supplied with business and is producing actively against its orders. Light-section rails are slow.

Wire Products.—Suggestions that the second-quarter price for nails would be $2.85, base per keg, Pittsburgh, and that on plain wire $2.70, base, per 100 lb., or $4 per ton advance over present prices are not taken seriously by manufacturers or jobbers. Manufacturers are somewhat concerned over the situation in nails, which are not moving into consumption in nearly as heavy volume as they are going from the mills, and it is a question whether further advances could be sustained in view of the large stocks and the protection given to jobbers. There is also the consideration that jobbers can sell profitably at lower than today's mill prices, plus the new card of extras, while retailers seem to be in no hurry to stock against later demands. The flow of orders for wire products, chiefly specifications against contracts, is steady and is sustaining a mill operation of between 65 and 75 per cent of capacity.

Tubular Goods.—Pipe mills still are getting more business in standard-weight or buttwelded pipe than in lapwelded goods, and shipments of former so far this year are running some 4 or 5 per cent smaller than in the same period last year. Production of oil is running lighter, but stocks above ground still are too bulky for the market to strengthen sufficiently to encourage drilling operations. California still is the most active field in drilling. Pipe line projects are numerous and involve large tonnage, but only a few have reached the mills for bids. Fair demand is noted for locomotive boiler tubes, and mechanical tubing is doing well. Prices of all kinds of tubular goods still are a little irregular.

Sheets.—Buyers still are specifying freely against old orders for sheets and there is a fair amount of contracting for second quarter tonnages, more particularly, however, on the part of automobile builders, who are preparing for an active second quarter in production and do not want to be caught short. Resistance to paying 4.15c., base, for body sheets, which compares with 4c. on first quarter tonnages, appears to be subsiding, and local mills do not find buyers unwilling to go along with the higher prices. Business continues better in the Central West than here or in the East.

Tin Plate.—Specifications against contracts are good and quotas for April shipment, which have been coming in since Feb. 15, are well up to expectations. New business is small. The Texas Co.'s inquiry for 100,000 boxes of oil can sizes and the Japanese inquiry for 60,000 boxes have not been closed, but the former is expected to go to the two companies which have had that company's business in recent years.

Hot-Rolled Flats.—Some second quarter business has been written at the higher prices announced earlier in the month and all makers appear to be holding to these prices. Meanwhile, buyers are specifying well against contracts for this quarter carrying lower prices and makers have obligations sufficient to provide a fairly high operation of mills.

Cold-Rolled Strips.—Makers are shipping freely on old and lower-priced obligations and meanwhile are writing a goodly amount of second quarter business at an advance of $3 a ton. Apparently they have encountered no serious resistance from buyers.

The Iron Age Composite Prices

Finished Steel

Feb. 28, 1928, 2.364c. a Lb.

One week ago	2.364c.
One month ago	2.336c.
One year ago	2.367c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 86 per cent of the United States output of finished steel.

	High		Low	
1928	2.364c.,	Feb. 14;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18
1924	2.789c.,	Jan. 15;	2.460c.,	Oct. 14
1923	2.824c.,	Apr. 24;	2.446c.,	Jan. 2

Pig Iron

Feb. 28, 1928, $17.75 a Gross Ton

One week ago	$17.75
One month ago	17.67
One year ago	18.96
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	$17.75,	Feb. 14;	$17.54,	Jan. 3
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7
1924	22.88,	Feb. 26;	19.21,	Nov. 3
1923	30.86,	Mar. 20;	20.77,	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	2.04c. to 2.09c.
F.o.b. Cleveland	1.85c. to 1.90c.
F.o.b. Lackawanna	1.95c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c. to 2.00c.
F.o.b. Birmingham	2.05c. to 2.15c.

Rail Steel

F.o.b. mills east of Chicago district	1.75c.
F.o.b. Chicago Heights mill	1.80c. to 1.85c.

Iron

Common iron, f.o.b. Chicago	1.90c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.15c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.10c. to 2.15c.
F.o.b. Coatesville	2.00c. to 2.05c.
F.o.b. Sparrows Point	2.00c.
F.o.b. Lackawanna	1.95c.
Del'd New York	2.17½c. to 2.22½c.
C.i.f. Pacific ports	2.30c.

Structural Shapes

	Base Per Lb.
F.o.b. Pittsburgh mills	1.85c. to 1.90c.
F.o.b. Chicago	1.95c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
F.o.b. Lackawanna	1.95c.
F.o.b. Bethlehem	2.00c.
Del'd Cleveland	2.04c. to 2.09c.
Del'd Philadelphia	2.12c. to 2.18c.
Del'd New York	2.14½c. to 2.19½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Flats (Hoops, Bands and Strips)

	Base Per Lb.
Narrower than 3 in., P'gh	2.20c. to 2.40c.
Wider than 3 in. to 6 in., P'gh	2.10c. to 2.20c.
6 in. and wider, P'gh	1.90c. to 2.00c.
Narrower than 3 in., Chicago	2.30c. to 2.50c.
From 3 to 6 in., Chicago	2.20c. to 2.30c.
6 in. and wider, Chicago	2.00c. to 2.10c.

*Mills follow plate or sheet prices according to gage on wider than 12 in.

Cold-Finished Steel

	Base Per Lb.
Bars, f.o.b. Pittsburgh mills	2.20c. to 2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill	*2.45c. to 2.90c.
Strips, under 12 in., 1 up to 3 tons, P'gh,	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, Cleveland	3.00c. to 3.15c.
Strips, under 12 in., 1 up to 3 tons, del'd Chicago	3.30c. to 3.45c.
Strips, under 12 in., 1 up to 3 tons, Worcester	3.25c. to 3.40c.

*According to size.

Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

	Base Per Keg
Wire nails	$2.65
Galvanized nails	4.65
Galvanized staples	3.35
Polished staples	3.10
Cement coated nails	2.65

	Base Per 100 Lb.
Bright plain wire, No. 9 gage	$2.50
Annealed fence wire	2.65
Spring wire	3.50
Galv'd wire, No. 9	3.10
Barbed wire, galv'd	3.35
Barbed wire, painted	3.10

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Woven Wire Fence

Base to Retailers Per Net Ton

F.o.b. Pittsburgh	$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

Sheets

Blue Annealed

	Base Per Lb.
Nos. 9 and 10, f.o.b. Pittsburgh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist. mill,	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.30c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.90c.
No. 24, f.o.b. Chicago dist. mill	3.00c.
No. 24, del'd Cleveland	3.09c.
No. 24, del'd Philadelphia	3.22c.
No. 24, f.o.b. Birmingham	3.05c.

Metal Furniture Sheets

No. 24, f.o.b. Pittsburgh, A grade	4.05c.
No. 24, f.o.b. Pittsburgh, B grade	3.85c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.65c. to 3.75c.
No. 24, f.o.b. Chicago dist. mill	3.85c.
No. 24, del'd Cleveland	3.84c. to 3.94c.
No. 24, del'd Philadelphia	4.07c.
No. 24, f.o.b. Birmingham	3.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.15c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill primes	4.10c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary and Elwood, Ind.	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago or Ohio Mill)

S. A. E. Series Numbers	Base Per 100 Lb.
2100*	(½% Nickel, 0.10% to 0.20% Carbon) $2.90 to $3.00
2300	(3½% Nickel) 4.00 to 4.10
2500	(5% Nickel) 5.00 to 5.25
3100	(Nickel Chromium) 3.00 to 3.10
3200	(Nickel Chromium) 4.75 to 5.00
3300	(Nickel Chromium) 6.75 to 7.00
3400	(Nickel Chromium) 6.00 to 6.25
5100	(Chromium Steel) 3.00 to 3.10
5200*	(Chromium Steel) 7.00 to 7.50
6100	(Chrom. Vanadium bars) 4.00 to 4.15
6100	(Chrom. Vanad. spring steel) 3.50 to 3.75
9250	(Silicon Manganese spring steel) 3.00 to 3.15
	Carbon Vanadium (0.45% to 0.55% Carbon, 0.15% Vanad.) 4.10 to 4.20
	Nickel Chrom Vanadium (0.60 Nickel, 0.50 Chrom., 0.15 Vanad.) 4.05 to 4.20
	Chromium Molybdenum bars (0.80—1.10 Chrom., 0.25—0.40 Molyb.) 4.00 to 4.25
	Chromium Molybdenum bars (0.50—0.70 Chrom., 0.15—0.25 Molyb.) 3.05 to 3.10
	Chromium Molybdenum spring steel (1 — 1.25 Chrom., 0.30 — 0.50 Molybdenum) 4.50 to 4.75

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 in. down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specification, but numbered by manufacturers to conform to S. A. E. system.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base Per 100 Lb.
Spikes, ⅝ in. and larger	$2.70 to $2.80
Spikes, ½ in. and smaller	2.70 to 2.80
Spikes, boat and barge	2.90 to 3.00
Tie plates, steel	2.25
Angle, bars	2.75
Track bolts, to steam railroads	3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count,	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	⅛ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ to ⅜	+19	+54
¼ to ⅜	47	30½	½	21	17
½	53	42½	¾	28	12
¾	58	47½	1 to 1½	30	14
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	15
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5 and 2½%, and on galvanized by 1½ points, with supplementary discount of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾ in.	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2½ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾	39		

Hot Rolled

2 and 2¼ in.	37	3¼ and 3½ in.	52
2½ and 2¾ in.	45	4 in.	56
3 in.	51	4½, 5 and 6 in.	51

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Old Material.—There is almost no consumer interest in scrap. Dealers, not being pressed for deliveries, are not giving the market much support by purchases against short sales. Heavy melting steel still is quoted at from $14.50 to $15, but it is so hard to find buyers at the higher figure that dealers have weakened to $14.75 for delivery at one point in the district. The situation in the steel works grades is very puzzling to dealers, who find consumers no more interested in supplies with steel production at 80 per cent of capacity than they were when operations were much lower. Heavy breakable cast is not overly strong at current quotations, as one important user has held up shipments. Steel foundries have paid $17.25 for railroad specialties. The March Baltimore & Ohio list is small, containing only 9870 gross tons, or little more than half of the previous list.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Furnace Grades:	
Heavy melting steel	$14.50 to $15.00
Scrap rails	14.50
Compressed sheet steel	14.00 to 14.25
Bundled sheets, sides and ends	13.00 to 13.25
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	15.00 to 15.50
Heavy breakable cast	13.50 to 14.00
No. 2 railroad wrought	15.00 to 15.50
Heavy steel axle turnings	13.00 to 13.50
Machine shop turnings	11.00
Acid Open-Hearth Furnace Grades:	
Railroad knuckles and couplers	16.75 to 17.25
Railroad coil and leaf springs	16.75 to 17.25
Rolled steel wheels	16.75 to 17.25
Low phosphorus billet and bloom ends	18.50 to 19.00
Low phosphorus, mill plate	17.50 to 18.00
Low phosphorus, light grade	16.50 to 17.00
Low phosphorus sheet bar crops	17.50 to 18.00
Heavy steel axle turnings	13.00 to 13.50
Electric Furnace Grades:	
Low phosphorus punchings	16.50 to 17.00
Heavy steel axle turnings	13.00 to 13.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.00
Short mixed borings and turnings	11.00
Cast iron borings	11.00
No. 2 busheling	10.00 to 10.25
Rolling Mill Grades:	
Steel car axles	18.00 to 19.00
No. 1 railroad wrought	11.00 to 11.50
Sheet bar crops	17.00 to 17.50
Cupola Grades:	
No. 1 cast	14.50 to 15.00
Rails 3 ft. and under	15.00 to 15.25
Malleable Grades:	
Railroad	14.50 to 15.00
Industrial	14.00 to 14.50
Agricultural	13.50 to 14.00

Cold-finished Steel Bars and Shafting.—Makers as yet have taken no action in connection with second quarter prices. Buyers are not showing interest in supplies that far ahead and there is probably some delay to see how well the latest advance in hot-rolled bars is maintained. Specifications on contracts for this quarter are coming in freely and in a good many cases there is much urgency about shipments. Most of the shipments carry 2.20c. base Pittsburgh, but on new business all makers are quoting $2 a ton more.

Alloy Steel Bars.—In view of the fact that hot-rolled bars have become established at an advance of $2 a ton over the prices of late last year and that in the meantime there has been no change in alloy bars, some makers of the latter are considering making an effort to get higher prices on second quarter business.

Bolts, Nuts and Rivets.—Business in bolts and nuts is not showing the expansion that was expected by this time. Not much railroad car business has been taken by Pittsburgh district builders and car work is one of the chief dependencies of local producers. Jobbers are taking small lots steadily. Rivet business still leaves something to be desired. Makers generally are asking more money for small rivets and the common quotation now is 70 and 10 per cent off list.

Coke and Coal.—Spot furnace coke has weakened again in the past week and, while there is still a quotation of $2.75 net at ovens, buyers do not have to shop much to find supplies at 10c. to 15c. a ton less. Indeed, most of the recent business has been at $2.60 to $2.70. Spot foundry coke holds at the recent range of prices, with supplies quite ample. The coal market shows neither life nor strength.

Warehouse Prices f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.65c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.10c.
Galvanized corrugated sheets (No. 28 gage), per square	$4.39
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	62½ per cent off list
Machine bolts, per 100 count.	62½ per cent off list
Carriage bolts, per 100 count.	62½ per cent off list
Nuts, all styles, per 100 count,	62½ per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft annealed, base per 100 lb.	$3.00 to 3.10
Wire, galvanized soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Two Shop Meetings Planned

Announcement has been made of two meetings devoted to machine shop practice topics—one at Chicago, March 14, and the other at Newark, N. J., March 28.

The Chicago meeting, under the auspices of the Chicago section of the American Society of Mechanical Engineers, will be held at the Morrison Hotel. Papers include: "Development of Fully-Inclosed Gear Drives for Industrial Speed Reduction," by J. A. Marland, engineer W. A. Jones Foundry & Machine Co., Chicago; "Special Machinery for Mass Production," by H. L. Blood, chief of machine design division, Western Electric Co., Chicago; "Production of Pressed Steel Frames by Automatic Machinery," by John P. Kelly, sales manager A. O. Smith Corporation, Milwaukee; and "Stopping Production Leaks Through a Simplified Production Control," by K. R. Wood, works manager Bell & Howell Co., Chicago. "The Relation of Chromium Plating to Industries and the Truth About Its Value and Application" is the title of a paper to be presented by Dr. J. Becker, chief research chemist Vacuum Can Co., Chicago.

The Newark, N. J., meeting, sponsored by the machine shop practice division of the A. S. M E., will be devoted to the design and building of jigs and fixtures. It will be held at the Y. M. C. A. building, 107 Halsey Street, and will be preceded by a dinner. F. P. Hutchinson, chief of tool design Western Electric Co., Kearny, N. J., and Harry Pound, assistant chief tool designer International Motor Co., Plainfield, N. J., will be speakers. W. F. Dixon, works manager Singer Mfg. Co., Elizabethport, N. J., will preside.

American Rolling Mill Co. Earnings Off

The American Rolling Mill Co., Middletown, Ohio, and its subsidiaries, exclusive of the Columbia Steel Co. and the Norton Iron Works, Inc., for the year ending Dec. 31, 1927, had net income after all charges of $3,748,654. This compares with net income of $4,065,050 in 1926. Total surplus as of Dec. 31, 1927, was $12,789,160, comparing with $12,432,390 at the close of 1926.

George M. Verity, president, in his annual report, declared that the volume of business during the first half of 1927 was satisfactory, but in the last half there was a distinct falling off. This is emphasized by the fact that the net earnings for the first six months were $3,001,209, as compared with $2,329,038 for the same months of 1926.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and over	$33.00
Rerolling, under 4-in. to and including 1¾ in.	$33.50 to 34.00
Forging, ordinary	38.00 to 39.00
Forging, guaranteed	43.00 to 44.00

Sheet Bars

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Slabs

	Per Gross Ton
8 in. x 2 in. and larger	$33.00
Smaller than 8 in. x 2 in.	34.00

Skelp

	Per Lb.
Grooved	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.

Wire Rods

	Per Gross Ton
*Common soft, base	$44.00
Screw stock	$5.00 per ton over base

*Chicago mill base is $45. Cleveland mill base, $44.

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.55
Old range non-Bessemer, 51.50% iron	4.40
Mesabi Bessemer, 51.50% iron	4.40
Mesabi non-Bessemer, 51.50% iron	4.25
High phosphorus, 51.50% iron	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	10.00c.
Iron ore, Swedish, average 66% iron,	9.25c. to 9.50c.
Manganese ore, washed, 52% manganese, from the Caucasus	39c.
Manganese ore, Brazilian, African or Indian, basis 50%	38c. to 39c.
Tungsten ore, high grade, per unit, in 60% concentrates	$10.25 to $10.75

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60 to $2.75
Foundry, f.o.b. Connellsville prompt	3.75 to 4.50
Foundry, by-products, Ch'go ovens	9.00
Foundry, by-product, New England, del'd	11.50
Foundry, by-product, Newark or Jersey City, delivered	9.45 to 9.85
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis	9.75

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	2.00 to 2.10
Mine run gas coal, f.o.b. Pa. mines	1.75 to 1.90
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.10
Gas slack, f.o.b. W. Pa. mines	1.10 to 1.20

Ferromanganese

	Per Gross Ton
Domestic, 80%, furnace or seab'd	$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid	100.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $32.00
Domestic, 16 to 19%	29.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50 to $88.50
75%	130.00 to 140.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$30.00	12%	$34.00
11%	32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$23.00	10%	$28.00
7%	24.00	11%	30.00
8%	25.00	12%	32.00
9%	26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal, del'd	92c. to 95c.
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$200.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$15.00
No. 2 lump, Illinois and Kentucky mines	$20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$16.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	$32.50

Fire Clay

	Per 1000 f.o.b. Works	
	First Quality	Second Quality
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	6.75c. to 6.50c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled threads up to and including ⅞ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages	80, 10 and 5
Stove bolts in bulk	80, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55 to 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(7/16-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10 to 70

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 10
Milled standard set screws, case hardened,	80 and 10
Milled headless set screws, cut thread	80
Upset hex. head cap screws, U.S.S. thread,	85 and 5
Upset hex. cap screws, S.A.E. thread	85 and 5
Upset set screws	80, 10 and 10
Milled studs	70 and 5

Chicago

Western Mills Advance Plates, Shapes and Bars to 2c., Mill

CHICAGO, Feb. 28.—Events of the week in the Chicago steel market center mainly around the price situation. Plates, shapes and soft steel bars have been advanced $1 a ton to 2c., Chicago. Acceptance by the trade of the new quotations is still somewhat in doubt, especially on plates and shapes, while on bars new sales appear to have established the advance. Many consumers are still specifying against 1.90c. steel and, not having had occasion to take advantage of the 1.95c. price, are raising objection to the more recent 2c. quotation. Producers are apparently firm in their intention to hold current purchases and second quarter business at the new levels.

A general average of ingot production strikes only a shade under 95 per cent of capacity, an advance of two points in the week, and specifications still continue to exceed output. If rails and track accessories are included, new buying is on a par with shipments; however, taking into account only the heavy tonnage finished steel products, new purchases show a decline from a week ago. There are no direct indications that consumptive demand has dropped off to any marked degree. Second quarter contracts are few.

Pig Iron.—Purchases in the week for second quarter and prompt delivery are in excess of 35,000 tons, and fresh inquiry indicates that the buying of iron for future delivery will be well sustained. A user north of Chicago has taken 5000 tons and two buyers, one in Wisconsin and one in Michigan, have placed orders for 2500 tons each. Prices for Northern foundry iron are steady at $18.50, local furnaces. Some unsteadiness is apparent in the charcoal iron market. Sales of Southern iron are small. Several spot inquiries for silvery are noted and carload sales made during the week indicate that the present price schedule is being maintained. Gains in shipments are most noteworthy in the case of malleable foundries.

Prices per gross ton at Chicago:

Northern No. 2 foundry, sil. 1.75 to 2.25	$18.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	19.00
Malleable, not over 2.25 sil.	18.50
High phosphorus	18.50
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	22.01
Southern No. 2 (barge and rail)	20.18
Low phos., sil. 1 to 2 per cent. copper free	$28.50 to 29.00
Silvery, sil. 8 per cent.	29.79
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for ferrosilicon are heavy. A consumer has made inquiry for 100 tons for early delivery, but to date has refused to accept the spot quotation of $87.50, delivered. Several orders have been placed for spiegeleisen. Fifty tons or less brings $32, Hazard, Pa., but a purchase of 100 tons of the 19 to 21 per cent grade was taken at less than $31.

Prices delivered Chicago: 80 per cent ferromanganese, $107.56; 50 per cent ferrosilicon, $83.50 to $87.50; spiegeleisen, 19 to 21 per cent, $38.76 to $39.76.

Plates.—Producers in the Chicago district have followed the leading interest in advancing plate prices to 2c. for lots of 100 tons or more and to 2.10c. for smaller tonnages. These prices are effective on all current business and they mark the opening of books for the second quarter. Plate mill backlogs are steady as incoming business balances shipments. Deliveries range from four to six weeks. The Pacific Fruit Express has placed orders for 2000 refrigerator cars, half to be built by the Pacific Car & Foundry Co. and half by the Pullman Car & Mfg. Corporation. This business will require close to 20,000 tons of steel, of which 10,000 tons will be furnished by Chicago mills. Over 50,000 tons of plates, shapes and bars will be needed for the 4650 cars now being inquired for by the Chicago, Milwaukee, St. Paul & Pacific. The Roxana Petroleum Corporation has bought 1500 tons of plates for four 80,000 bbl. oil storage tanks. Fresh inquiry from oil producers totals close to 7000 tons of tankage material. The plate market in this district is in a healthy condition, though it may be several weeks before a real test of the new prices will come.

Mill prices on plates per lb.: 1.95c., base Chicago.

Structural Material.—This market remains active. The American Bridge Co. has taken 6000 tons and the Milwaukee Bridge Co. 1400 tons for the Sixteenth Street viaduct, Milwaukee. A local fabricator has taken 600 tons for an apartment building. The Central States Bridge Co. is low bidder on 3000 tons for a department store at Indianapolis. New projects total over 8000 tons, including 3500 tons for the Austin, Ill., high school and 1500 tons for an industrial building at Ottawa, Ill. Fabricators look for the early award of the 4000 tons required for the Steuben Club, Chicago. All local producers have announced the opening of second quarter books on structural material at prices that range from 2c. to 2.10c., the latter applying on orders for less than 100 tons. These prices take effect immediately but in the four or five days in which they have been quoted sales have not been large and it is generally admitted that further tests are needed to establish the market at the new levels.

Mill prices on plain material per lb.: 1.95c. to 2.10c., base, Chicago.

Bars.—A feature of this market is the unusual demand for soft steel bars by automobile plants and manufacturers of accessories. The Chevrolet schedule for March is said to be 127,000 cars. Farm machinery manufacturers are heavily engaged, especially in tillage equipment. Road machinery builders are rounding out an active winter season and give promise of sustained activities as they enter their heavy selling period. New prices for soft steel bars, 2c. to 2.10c., Chicago, appear to be established. Deliveries are steady at four to six weeks. Prices for alloy steel bars are firm and it is reported that advances are being considered by producers. Local alloy bar mills are engaged at close to capacity. Specifications exceed shipments and deliveries are being extended. Iron bars have been advanced to 2c., Chicago, not because of the favorable position of producers but rather to bring prices for this commodity in line with the new quotation on soft steel bars. Bar iron order books are light and current shipments are small. Rail steel bar rollers have opened books at 1.85c., Chicago Heights mills, for second quarter delivery. Meanwhile orders will be accepted for delivery up to March 31 at 1.80c. Order books in hard steel bars are the best in several months and specifications are running ahead of shipments. Both rail steel bar mills are operating double turn.

Mill prices per lb.: Soft steel bars, 1.95c. to 2.10c., base, Chicago; common bar iron, 2.00c., base, Chicago; rail steel bars, 1.80c. to 1.85c., base, Chicago Heights mill.

Cast Iron Pipe.—Detroit has closed for 2000 tons of 24-in. pipe at prices that were within a few cents of $30, Birmingham. James B. Clow & Sons took 600 tons, the National Cast Iron Pipe Co. 400 tons, and the American Cast Iron Pipe Co. 1000 tons. The only new inquiry of note this week comes from Rockford, Ill., where prices are being asked on 500 tons of 6-in. to 24-in. pipe and 35 tons of fittings. C. J. Ryan has been awarded a general contract by Elmhurst, Ill. Although pipe business now before the trade is not large, it is generally understood that a number of municipalities are shaping their requirements and that as spring opens this market will show satisfactory activity. Deliveries average 30 days and prices are steady at $29.50 to $30, Birmingham, for 6-in. and larger diameters.

Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, $37.70 to $38.20; 4-in., $41.70 to $42.20; Class A and gas pipe, $4 extra.

Rails and Track Supplies.—Six Western railroads have placed orders for a total of 35,000 tons of standard-section rails. Although local mills look forward to additional orders for rails, the amount cannot be large for the reason that the major buying movement for delivery in the spring and early summer is practically completed. Rails purchased in the buying movement now closing are reported at close to 2,000,000

tons for the entire country. This is about equal to the tonnage placed during the corresponding period a year ago. Several railroads have ordered a total of 15,000 tons of track accessories and definite inquiry is before the trade for an additional 15,000 tons. Output of accessories is proportionate to rail production, which now stands at 90 per cent of mill capacity. The light rail market is dull.

Wire Products.—Little change is noted in this market. Irregularities in quotations still occur here and there, but they are not of sufficient importance to disturb the general price structure. Wire mill operations are variously estimated at between 72 and 75 per cent of capacity. Specifications and new orders are heavier than shipments and deliveries of some wire products are lengthening. Orders from jobbers in the South are particularly good. The trade in the Northwest is marking time, but producers are hopeful that business in that territory will improve with the end of winter weather. Demand from the manufacturing trade is steady. Current requirements for fencing by the railroads are not large.

Sheets.—Local hot mills are heavily engaged and, with specifications running well ahead of shipments, deliveries have been extended to four to six weeks. A fair volume of second quarter business has been added to producers' books. Current prices are firm at 3.90c., Chicago, for galvanized, 2.35c. for blue annealed sheets 40 in. and wider and 2.25c. for narrower, and 3.05c. for black sheets. A few orders have been received this week from the Northwest, a territory that has been very dull since early last fall. Car builders are ordering out roofing sheets and a good tonnage is being taken for oil tank roofs. Distribution of sheets by warehouses is small.

Base prices per lb., delivered from mill in Chicago: No. 24 black, 3.05c.; No. 24 galvanized, 3.90c.; No. 10 blue annealed, 2.25c. to 2.35c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Bolts, Nuts and Rivets.—Specifications have shown further improvement, especially from the railroads and manufacturers of railroad equipment. Local sellers are expecting the contracting period for second quarter to open in the next week or 10 days. Prices on practically all of these commodities are strong, this being true especially of stove bolts.

Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, $43; light rails, rolled from billets, $36. *Per Lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.25c.; angle bars, 2.75c.

Reinforcing Bars.—New projects continue to come out faster than awards are made, and while estimators are kept busy shop operations are at less than 50 per cent of capacity. The State hard road program is shaping rapidly and several general contracts have been placed. It is reported that only a small tonnage of reinforcing steel will be required for the Chicago Daily News Building. Quotations on billet steel reinforcing bars out of Chicago warehouses range from 2.35c. to 2.75c. On the ordinary run of business in rail steel bars 1.80c. is asked and on bridge and culvert work 1.95c., Chicago Heights mills, is quoted. Recent awards and new projects are shown on page 641.

Coke.—Shipments of by-product foundry coke so far in February are in excess of the total for January. As this commodity is not stocked by users but is ordered out as required, it gives an accurate reflection of foundry melt. Prices are firm at $9, f.o.b. local ovens, and $9.50, delivered in the Chicago switching district.

Old Material.—A consumer has taken 10,000 tons of heavy melting steel at $13 a gross ton, delivered. Dealers, who are having some difficulty in covering old orders, are paying $12.50 to $13, depending on the grade sought and the destination. Malleable and cast grades are accumulating and they are not only difficult to sell but hold-up orders are of common occurrence. Low phosphorus grades are coming out faster than consumption demands and cast iron borings are still slow. Prices for the latter grade are sagging. Included among railroad lists are 7800 tons by the St. Paul, and 5000 tons each by the Burlington, Illinois Central and the Missouri Pacific.

Prices delivered consumers' yards, Chicago:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$12.75 to $13.25
Shoveling steel	12.75 to 13.25
Frogs, switches and guards, cut apart, and miscellaneous rails.	14.25 to 14.75
Hydraulic compressed sheets	11.25 to 11.75
Drop forge flashings	9.75 to 10.25
Forged, cast and rolled steel carwheels	15.25 to 15.75
Railroad tires, charging box size.	16.50 to 17.00
Railroad leaf springs, cut apart	16.50 to 17.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	14.50 to 15.00
Coil springs	16.50 to 17.00
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phosphorus punchings	14.25 to 14.75
Low phosphorus plate, 12 in. and under	13.50 to 14.00
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.00 to 10.50
Short shoveling turnings	10.00 to 10.50
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	13.50 to 14.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft	15.50 to 16.00
Angle bars, steel	14.25 to 14.75
Cast iron carwheels	14.00 to 14.50
Malleable Grades:	
Railroad	13.00 to 13.50
Agricultural	12.50 to 13.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb	23.00 to 25.00
*Relaying rails, 65 lb. and heavier.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	11.25 to 11.75
No. 1 busheling	9.25 to 9.75
No. 2 busheling	4.25 to 4.75
Locomotive tires, smooth	12.50 to 13.00
Pipes and flues	8.00 to 8.50
Cupola Grades:	
No. 1 machinery cast	14.50 to 15.00
No. 1 railroad cast	13.00 to 13.50
No. 1 agricultural cast	13.00 to 13.50
Stove plate	11.25 to 11.75
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.35c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.95c.
Galvanized sheets (No. 24)	4.80c.
Blue annealed sheets (No. 10)	3.50c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.60c.
Rivets, boiler	3.60c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, squares, tapped or blank	60
Hot-pressed nuts, hexagons, tapped or blank	60
No. 8 black annealed wire, per 100 lb	$3.20
Common wire nails, base per keg	3.00
Cement coated nails, base per keg	2.90

Puddlers' Wage Rate Unchanged

Puddlers in Mid-Western mills operating under the sliding scale wage agreement of the Amalgamated Association of Iron, Steel & Tin Workers, will receive for March and April $11.05 per ton for boiling iron, unchanged from the rate paid in January and February. Finishing hands will be paid the same rates as the first two months. At the bi-monthly examination of sales sheets last week, the average selling price of bar iron shipped the 60 days ending Feb. 20 was disclosed as $1.85 per 100 lb., or unchanged from the average of two previous months.

Cleveland

Steel Bookings for February Decline—Ford Inquires for 443,000 Tons of Ore

CLEVELAND, Feb. 28.—Independent mills have followed the Carnegie Steel Co. in advancing steel bars, plates and shapes $1 a ton to 1.90c., Pittsburgh, and Cleveland bar mills have made a similar advance on steel bars to 1.90c., Cleveland. A few contracts have been taken at the new price. While steel specifications continue in good volume, February bookings will fall slightly below those of January.

Orders for steel bars, plates and shapes are now nearly all against 1.80c. contracts, as buyers generally covered before the advance to 1.85c. Several of the Michigan automobile and parts makers are inquiring for steel bars, sheets and strip steel for deliveries into or through the second quarter. Some business is reported to have come from that source in sheets and strip steel at the new prices. The Ford Motor Co., which expects to get on a daily production schedule of 1250 cars in March, has inquiries out for steel in various forms for early requirements.

Business in the structural field is coming out in satisfactory volume, but in spite of the recent improvement competition is unusually keen and some of the prices that have been named recently for fabricated work are said to be the lowest in several years. An inquiry is pending for 1500 tons of sheet steel piling for the Union Terminals project for work awarded to the Bates & Rogers Construction Co. The Wheeling & Lake Erie Railroad is inquiring for 12,000 tie plates.

Some business in auto body sheets has been taken for April shipment at the regular 4.15c. price, but little business has so far been done in second quarter contracts. Black and blue annealed sheets continue to move well in specifications against contracts, but there is not much tonnage in current orders. The demand for galvanized sheets continues slow and these show no tendency to strengthen. Concessions of $2 or more a ton from 3.75c., Pittsburgh, appear rather common.

Pig Iron.—The market continued active during the week with sales aggregating 37,000 tons by Cleveland interests, compared with 53,000 tons during the previous week. Of the total, approximately 10,000 tons was for shipment to the Eastern territory. The remaining activity was largely centered in Michigan, although there was some buying in Cleveland and other parts of the northern Ohio territory. Sales generally were for second quarter. Inquiry is less active. The market has a fairly firm tone and one Lake furnace producer, which recently advanced its price on foundry and malleable iron to $17.50 has been able to take some business on that basis, though $17 is the more common quotations and that is still being shaded to $16.75 for shipment to some competitive points. In Michigan the market is holding at $18. February shipments will be about the same as in January, being heavy to the automotive industry and fair to other consumers.

Prices per gross ton at Cleveland:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$18.50
Southern fdy., sil. 1.75 to 2.25	22.00
Malleable	18.50
Ohio silvery, 8 per cent	28.00
Basic, Valley furnace	17.00
Standard low phos., Valley furnace	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Reinforcing steel bars	2.25c. to 2.75c.
Cold-finished rounds and hexagons	3.65c.
Cold-finished flats and squares	4.15c.
Hoops and bands	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.75c.
Galvanized sheets (No. 24)	4.40c. to 4.60c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb	$2.90
No. 9 galvanized wire, per 100 lb	3.35
Common wire nails, base per keg	2.90

*Net base, including boxing and cutting to length.

Fluorspar.—The gravel fluorspar market has a firmer tone and a leading producer has advanced this grade 50c. a ton to $15, at which it sold 3000 tons to a Pittsburgh district consumer. Another sale of 1000 tons was made to a Cleveland mill.

Iron Ore.—An inquiry for 443,000 tons of iron ore has been sent out by the Ford Motor Co., which is 10 per cent more than this company purchased last year. Its inquiry includes 286,000 tons of basic ore, 66,000 tons each of manganiferous and high phosphorus and 25,000 tons of silicious ore. The Ford company is the largest open market ore buyer and several times the season's prices have been established by this company's purchases. It may be several weeks before ore firms submit bids to the Ford company. Other consumers are showing little interest in the market and producers have not given prices serious consideration. Indications point to the reestablishment of the 1927 prices, which also prevailed during the two previous years.

Strip Steel.—Not much new business in hot-rolled strip is coming out, but specifications against low-priced contracts are holding up well. While mills are quoting the recently named higher prices, there has been no real test of these prices on round-lot business. Cold-rolled strip is moving in good volume and mills are running close to capacity. Sizable lots are reported to have been taken in the Detroit territory for the second quarter at the new price.

Reinforcing Bars.—Two local awards aggregating 1050 tons were made during the week. Small-lot inquiry is fair. Rail steel bars are unchanged at 1.75c., mill.

Coke.—The price of by-product foundry coke for March is announced at $8, Painesville, or $9.01, delivered Cleveland, the same as prevailed this month.

Semi-Finished Steel.—Specifications which recently fell off somewhat have increased as consumers are sending in orders for their March requirements and the leading local producer is now operating 10 of 14 open-hearth furnaces. As practically all consumers are under contract, there is very little new business. Quotations are unchanged at $33, Cleveland, for sheet bars, billets and slabs.

Bolts, Nuts and Rivets.—The demand for bolts and nuts, while fair, has not increased. February orders are larger than January, but not up to February, last year. Automobile companies are specifying quite freely. Rivets are moving slowly. Prices on these products are firm.

Old Material.—The market continues dull, as there is no new consumer demand and mills are still restricting shipments. Consequently dealers are buying little scrap to fill outstanding orders. Production is in excess of the demand, especially of blast furnace scrap. This is due in part to the fact that some of the blast furnaces that were using considerable scrap a few months ago are now using very little. Short shoveling turnings are a drug on the market. Blast furnace scrap has declined 25c. a ton and is now rather freely offered at $10. This is the second reduction in two weeks.

Prices per gross ton, delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$13.75 to $14.00
No. 2 heavy melting steel	13.25 to 13.50
Compressed sheet steel	12.75 to 13.00
Light bundled sheet stampings	11.50 to 11.75
Drop forge flashings	12.50 to 13.00
Machine shop turnings	9.00 to 9.25
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	13.50 to 14.00
No. 1 busheling	11.00 to 11.25
Pipes and flues	9.00 to 9.50
Steel axle turnings	12.50 to 13.00
Acid Open-Hearth Grades	
Low phosphorus forging crops	16.50 to 17.00
Low phosphorus, billet, bloom and slab crops	17.00 to 17.50
Low phosphorus sheet bar crops	16.50 to 17.00
Low phosphorus plate scrap	16.00 to 16.50
Blast Furnace Grades	
Cast iron borings	10:00 to 10.25
Mixed borings and short turnings	10.00 to 10.25
No. 2 busheling	10.00 to 10.25
Cupola Grades	
No. 1 cast	16.50 to 17.00
Railroad grate bars	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft	18.00 to 18.50
Miscellaneous	
Railroad malleable	15.00 to 15.50
Rails for rolling	16.25 to 16.50

Philadelphia

Plates, Shapes and Bars Advanced $1—Outstanding Quotations Not Withdrawn

PHILADELPHIA, Feb. 28.—Mills have generally followed the recent advance of $1 per ton on plates, shapes and bars, but outstanding quotations at the former prices have not been withdrawn, and one producer of shapes in eastern Pennsylvania is still quoting on the old basis. Specifications against first quarter contracts still lag and but little new business has appeared. February tonnage has been light, but as many consumers evidently overestimated their requirements in January and have been using up this slight excess during the past month, sellers believe that March will see specifications coming in more freely. Meanwhile, another $1 a ton increase in prices on the heavy tonnage products seems to be expected by sellers about the beginning of the second quarter.

Pig Iron.—Current purchasing is principally of foundry grades in small lots and on this business $20 per ton, base furnace, is quite firm. Some inquiry for second quarter delivery has appeared, but as yet there is not a great deal of interest in such contracts, as there will undoubtedly be some tonnage carried over from this quarter. A recent sale of about 100 tons of No. 2X Indian foundry iron is reported to have been made at about 50c. per ton below the eastern Pennsylvania market. The Eastern Foundry Co., Boyertown, Pa., is about to close on 300 to 500 tons of foundry iron. The inquiry of the American Radiator Co. for 2000 tons of foundry iron for Gloucester, N. J., has not been closed. No sales of basic are reported and only occasional carload lots of low phosphorus have been closed lately.

Prices per gross ton at Philadelphia:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26
East. Pa. No. 1X	21.76
Basic (delivered eastern Pa.)	$19.50 to 20.00
Gray forge	19.75 to 20.25
Malleable	21.00 to 21.50
Standard low phos. (f.o.b. New York State furnace)	23.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00
Virginia No. 2 plain, 1.75 to 2.25 sil.	24.54 to 25.04
Virginia No. 2X, 2.25 to 2.75 sil.	25.04 to 25.54

Prices, except as specified otherwise, are delivered Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—Transactions are largely in specifications against first quarter contracts. Although consumers are slow in taking shipments, they are in most cases promising full specifications against contracts before the end of the quarter and with the new price level of 1.90c. per lb., Pittsburgh, not much tonnage on current contracts is expected to carry over.

Shapes.—Mills are prepared to quote the new price level of 2.05c. per lb., Bethlehem, on new business, but this price is untested. Not all eastern Pennsylvania mills have advanced to the new level, so that the market is quotable today at 2.12c. to 2.18c. per lb., delivered Philadelphia. Specifications are coming in rather slowly and some carry-over of shipments against present contracts into the next quarter seems probable, unless considerable activity develops in the coming month. Not much fabricated business is being awarded, but some sizable projects are in prospect.

Plates.—Eastern Pennsylvania mills have adopted the new price of 2.05c. per lb., Coatesville, or 2.15c. per lb., delivered Philadelphia, but outstanding quotations of 2c. per lb., Coatesville, have not been withdrawn. Consumers are slow in specifying against contracts. Mills seem confident that the second quarter will begin with another $1 per ton increase in prices. The Cruse-Kemper Co., Philadelphia, which was awarded a contract for a 3,000,000-cu. ft. gas holder by the United Gas Improvement Co., has placed about 1600 tons of plates with an eastern Pennsylvania mill.

Sheets.—There is a moderate volume of activity in blue annealed and galvanized sheets and prices continue to show more firmness. Blue annealed sheets continue at 2.10c. per lb., Pittsburgh, with 10c. per 100 lb. extra for wider than 40 in. Black sheets are quoted at 2.75c. to 2.90c. per lb., and galvanized at 3.65c. to 3.75c. per lb., Pittsburgh.

Warehouse Business.—Although February was a short month, its total business compared favorably with January. There is a moderate demand for small lots of structural material from stock and galvanized sheets are fairly active. Business in other products continues light.

Imports.—In the week ended Feb. 25 imports of pig iron at Philadelphia were larger than for several weeks. A total of 1650 tons of pig iron arrived, of which 1559 tons was Indian and 51 tons Dutch iron. Thirteen tons of tungsten ore was received from the United Kingdom. Steel imports consisted of 86 tons of structural shapes and 67 tons of bars from France.

Old Material.—No sizable purchases of scrap are reported to have been made in the past week and prices are substantially unchanged. An eastern Pennsylvania steel company which has been offering $12.50 per ton, delivered, for stove plate and less than $11 per ton for machine shop turnings, has been unable to purchase at these prices, but has not yet paid more. Most grades are rather inactive except for shipments on old contracts, but prices show no downward tendency.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$13.50 to $14.00
Scrap T rails	13.00 to 13.50
No. 2 heavy melting steel	11.00 to 11.50
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	10.50 to 11.00
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast boring (for steel works and rolling mill)	11.00
Heavy breakable cast (for steel works)	15.50 to 16.00
Railroad grate bars	13.00
Stove plate (for steel works)	13.00
No. 1 low phos., heavy, 0.04 per cent and under	18.00 to 18.50
Couplers and knuckles	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
No. 1 blast furnace scrap	10.50 to 11.00
Machine shop turnings (for rolling mill)	11.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Shafting	17.50 to 18.00
Steel axles	19.00 to 20.00
No. 1 forge fire	11.00 to 12.00
Steel rails for rolling	15.00 to 15.50
Cast iron carwheels	15.50 to 16.50
No. 1 cast	16.00 to 16.50
Cast borings (for chemical plant)	14.50 to 15.00

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c. to 2.50c.
Plates, ⅜-in.	2.80c. to 3.00c.
Structural shapes	2.40c. to 2.60c.
Soft steel bars, small shapes and iron bars (except bands)	2.40c.
Round-edge iron	3.50c.
Round-edge steel, iron finished, 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforcing steel bars, square, twisted and deformed	2.50c. to 3.00c.
Cold-finished steel, rounds and hexagons	3.35c.
Cold-finished steel, squares and flats	3.85c.
Steel hoops	3.50c.
Steel bands, No. 12 gage to ⅛-in., inclusive	3.25c.
Spring steel	5.00c.
Black sheets (No. 24)	4.25c.
Galvanized sheets (No. 24)	5.10c.
Blue annealed sheets (No. 10)	3.15c.
Diamond pattern floor plates—	
¼-in.	5.30c.
3/16-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

Wheeling Steel Corporation Licensed to Use Continuous Sheet Process

Announcement has been made by the American Rolling Mill Co. that the Wheeling Steel Corporation has been granted a license for the full use of all patents owned or controlled by the former covering the continuous rolling of sheets. This is the second company which has availed itself of the license rights, the Weirton Steel Co. having been the first.

New York

Steel Price Advance Not Yet General—Pig Iron Active

NEW YORK, Feb. 28.—Pig iron buying continues in good volume, as evidenced by sales during the week of about 15,000 tons in this district, besides a number of large tonnages placed in New England. The American Tube & Stamping Co. division of the Stanley Works, Bridgeport, Conn., is reported to have closed for 10,000 tons of basic iron, and the Washburn Wire Co., Phillipsdale, R. I., for 5000 tons. The National Radiator Corporation, Johnstown, Pa., which was in the market for 5000 tons of foundry iron, has bought both for its Johnstown and its Trenton, N. J., plants, having placed 1000 tons for the latter. The A. P. Smith Mfg. Co., East Orange, N. J., has closed for 600 tons of foundry for delivery from April through July. The Crane Co., Bridgeport, Conn., has not yet bought against its inquiry for 1500 tons of foundry and malleable. Several other sizable inquiries are still open, and the amount of business pending exceeds 10,000 tons. The approach of the opening of navigation has made competition keener, particularly in territory where Buffalo and eastern Pennsylvania irons are competitive. A round tonnage of Buffalo foundry iron was recently sold in eastern Pennsylvania at $20.89 per ton, delivered. The combination water and rail rate from Buffalo is reported to have been $4.39, made up of $2.50 for barge shipment to Jersey City, N. J., 25c. for handling to freight cars and a railroad freight rate of $1.64 to destination. As low as $19.25, delivered, is understood to have been done on water shipments from outside furnaces to Delaware River points. This competition is making it difficult for eastern Pennsylvania producers to establish their recent advance to $20, base furnace. Prices on Buffalo foundry iron for shipment to this district have generally subsided to $16.50, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$21.41 to $21.91
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.39 to 22.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	20.89 to 23.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.39 to 23.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

Ferroalloys.—The only new business in ferromanganese and spiegeleisen is the sale now and then of a few carloads for early delivery. Specifications on contract for both ferroalloys, as well as for ferrosilicon or ferrochromium, are reported as quite satisfactory.

Finished Steel.—Not all mills have followed the advance of $1 a ton on plates, shapes and bars announced last week by the Carnegie Steel Co. Some are watching developments, but it seems certain that the advance will become general before the end of this week. Meanwhile, mills are giving preferred customers an opportunity to protect themselves for second quarter on the basis of the former prices. The new level will make New York delivered prices as follows: Steel bars, 2.24c.; shapes, 2.19½c.; plates, 2.22½c. Some of the Eastern plate mills have named 2.05c., Coatesville, although the Bethlehem Steel Co. at this writing has made no announcement of an upward revision of its base prices. In volume of new business the local steel trade is quiet, but specifications against contracts are coming along in a fair way. Some contract customers have not specified in full, which gives ground for the assumption that they were covered on their maximum requirements, which in numerous instances have not been consumed. Except for the coverage on plates, shapes and bars at the prices in effect prior to the Carnegie advance, consumers have taken little interest in second quarter contracts. Sheet buyers are holding off, probably because the market in the East has not taken on the strength reported from the Middle West. Railroad business is disappointedly small both as to railroad companies' own repair and maintenance work and freight car buying.

Mill prices per lb., delivered New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.17½c. to 2.22½c.; structural shapes, 2.14½c. to 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Quotations on bell and spigot pipe continue to show variation. Birmingham foundries are quoting from $28 to $29 per ton, base Birmingham, but Northern makers are considerably below this level, although on a higher basis f.o.b. their plants because of lower freight rates. Only a small tonnage is pending. Recent purchases have included slightly less than 1000 tons of water pipe by Newark, N. J., from the Warren Foundry & Pipe Co. and about 500 tons of centrifugal pipe by Hartford, Conn., from the National Cast Iron Pipe Co. At the opening of bids Feb. 27, by New York City on about 2000 tons of water pipe, R. D. Wood & Co. were low with the following delivered prices: On 410 tons of 20-in., $36.75; on 510 tons of 12-in. and 890 tons of 8-in., $35.75; on 210 tons of 6-in., $36.75, and on seven tons of 4-in., $39.75 per ton. On 265½ tons of fittings, the Stewart Steel Products Co., New York, was low on 155 tons, Terminal Supply Co., New York, on 60 tons, R. D. Wood & Co. on 37 tons, United States Cast Iron Pipe & Foundry Co. on 11 tons and the Warren Foundry & Pipe Co. on 2½ tons.

Prices per net ton, delivered New York: Water pipe 6-in. and larger, $37.25 to $38.25; 4-in. and 5-in., $42.25 to $43.25; 3-in., $52.25 to $53.25; Class A and gas pipe, $4 to $5 extra.

Warehouse Business.—Purchasing from stock is beginning to increase. With structural and plate fabricating shops slightly more active on spring projects, continued improvement is expected. Although February was a short month, its total business was larger than that of January. Black and galvanized sheets are less active than a few weeks ago, but prices continue firm.

Reinforcing Bars.—The Jones & Laughlin Steel Corporation will furnish 1000 tons of bars for a warehouse in Manhattan. A number of fair size jobs have been let, but the market could hardly be called active. Some distributers have already advanced the mill price $1 a ton to 2c. per lb., Pittsburgh, and others expect to follow this increase before the end of the week. New York and Youngstown warehouse prices are unchanged.

Coke.—Standard foundry coke continues at $4 to $4.50 per ton, Connellsville. Delivered prices are: To northern New Jersey, $8.03 to $8.53; to New York or Brooklyn, $8.79 to $9.29; to Newark or Jersey City, $7.91 to $8.41. By-product coke continues at $9 to $9.40 per net ton, delivered Newark or Jersey City, from a local producer and $9.21 to $9.41 per net ton, delivered from a West Virginia operation.

Old Material.—Buying prices of all grades are unchanged with the exception of yard grade of heavy melting steel, which is being generally purchased at $11 per ton, delivered to consumers at Phoenixville, Harrisburg and Pottsville, Pa. Shipments of specification pipe to a Lebanon, Pa., consumer are being delayed, but brokers are still offering $12.50 per ton delivered. No. 1 heavy melting steel is moving to Bethlehem, Steelton, Coatesville and Conshohocken, Pa., and Claymont, Del., at $13.50 per ton, delivered.

No. 1 heavy melting steel	$10.00 to $10.85
Heavy melting steel (yard)	7.25 to 7.50
No. 1 heavy breakable cast	11.25 to 12.00
Stove plate (steel works)	8.75 to 9.00
Locomotive grate bars	8.75 to 9.00
Machine shop turnings	6.75 to 7.50
Short shoveling turnings	7.00 to 7.50
Cast borings (blast furnace or steel works)	6.75 to 7.50
Mixed borings and turnings	7.00 to 7.50
Steel car axles	16.00 to 16.50
Iron car axles	23.75 to 24.75
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.75
Forge fire	6.75 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought, long	9.00 to 9.50
Rails for rolling	10.50 to 11.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	10.00 to 10.50
Cast borings (chemical)	11.00 to 11.50

Prices per gross ton, delivered local foundries:

No. 1 machinery cast	$13.75 to $14.25
No. 1 heavy cast (columns, building materials, etc.), cupola size	11.75 to 12.25
No. 2 cast (radiators, cast boilers, etc.)	11.25 to 11.75

Birmingham

Southern Mills Follow Advance of $1 on Plates, Shapes and Bars

BIRMINGHAM, Feb. 28.—The pig iron market continues rather quiet. Second quarter inquiries are trickling in, but the movement has not developed to any size. A few sales are reported, but mostly small-lot tonnage. Shipments continue on the same level as the past few weeks and are close to production. Quotations on foundry iron continue on a $16 base. Seventeen furnaces are in blast, nine being on foundry, seven on basic and one on recarburizing iron. Operations have not changed in several weeks.

Prices per gross ton, f.o.b. Birmingham district furnaces:

No. 2 foundry, 1.75 to 2.25 sil	$16.00
No. 1 foundry, 2.25 to 2.75 sil	16.50
Basic	15.00

Finished Steel.—Another advance of $1 per ton on plates, bars and structural shapes has been made in line with increases in other markets. It is the third since mid-November. Tonnage is coming in regularly and the market has a firm tone and favorable outlook. Open-hearth operations have not changed within the past several weeks. The Tennessee Coal, Iron & Railroad Co. is operating 13 and 14 of its 19 open-hearths and the Gulf States Steel Co. has four of its six in operation.

Cast Iron Pipe.—Small-tonnage pressure pipe business is coming in at a fair rate. The market appears stronger and a good volume of tonnage is in prospect. Prices are slightly stronger and base quotations are now $29 to $30. Plant operations are about the same as in the past month.

Coke.—A few inquiries have been received for second quarter, but interest is still slight. Only a small tonnage has been booked to date. Shipments on old contracts are going forward at an even rate. Quotations for spot, March and second quarter coke are all at $5.

Old Material.—Some of the standard items are moving a little better, but the market as a whole is not active. Prices are unchanged.

Prices per gross ton, delivered Birmingham district consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	11.00 to 11.50
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	19.00 to 20.00
Iron axles	20.00 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	13.00
No. 1 cast	15.00
Tramcar wheels	12.50 to 13.50
Cast iron carwheels	12.00 to 13.00
Cast iron borings, chemical	13.50 to 14.00

Canada

Steel and Pig Iron Business Continues to Gain—Scrap Quiet

TORONTO, ONT., Feb. 28.—New business continues in such volume that the iron and steel industry of Canada is in a much better position with regard to unfilled orders and orders in prospect than it has been for several years. Buyers are extending the scope of their purchases and many lines of steel are featured in recent orders and contracts.

Production of pig iron in Canada in January amounted to 65,006 gross tons, marking a slight increase over the 63,197 tons reported for December, 1927. Production in January, 1927, amounted to 51,717 tons and in January, 1926, to 56,644 tons. Production of steel ingots and castings in January amounted to 84,295 tons, which was 15 per cent below the 96,248 tons produced in December, but 44 per cent greater than the 58,551 tons of January, 1927.

Pig Iron.—With the betterment that features many lines of the iron and steel industry of this country, pig iron sales tend to expand. While the greater part of current demand is for spot delivery, tonnages involved in orders are larger than those recently placed, and local blast furnace representatives are much more optimistic in their statements regarding both current and future business. Inquiries are appearing for second quarter iron, and a few melters have covered for that

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Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-rolled strip, soft and quarter hard,	5.15c. to 5.40c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage),	3.84c. to 3.89c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

Machine bolts, cut thread:	Per Cent Off List
¾ x 6 in. and smaller	55 to 60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	55 to 60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	55 to 60
1 x 16 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded steel, 2-in	$17.33
Seamless steel, 2-in	20.24
Charcoal iron, 2-in	25.00
Charcoal iron, 4-in	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
⅛-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
⅛-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c. to 4.00c.
No. 22	3.95c. to 4.15c.
No. 24	4.00c. to 4.20c.
No. 26	4.10c. to 4.30c.
No. 28*	4.25c. to 4.45c.
No. 30	4.50c. to 4.70c.

Sheets, Galvanized

	Per Lb.
No. 14	4.35c.
No. 16	4.45c.
No. 18	4.35c. to 4.60c.
No. 20	4.50c. to 4.75c.
No. 22	4.55c. to 4.80c.
No. 24	4.70c. to 4.95c.
No. 26	4.95c. to 5.20c.
No. 28*	5.20c. to 5.45c.
No. 30	5.60c. to 5.85c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

period. The improvement in operations in the automotive industry has given impetus to foundry activities. Prices continue firm.

Prices per gross ton:

Delivered Toronto	
No. 1 foundry, sil. 2.25 to 2.75	$23.60
No. 2 foundry, sil. 1.75 to 2.25	23.60
Malleable	23.60
Delivered Montreal	
No. 1 foundry, sil. 2.25 to 2.75	$25.00 to $25.50
No. 2 foundry, sil. 1.75 to 2.25	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00
Imported Iron at Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Old Material.—Business in scrap has not improved as rapidly or to as great an extent as in other iron and steel lines, but dealers report more interest on the part of buyers. Export demand continues to grow, but a larger volume of old material is entering Canada from the United States than is going over the international boundary from this country. Prices are gaining in strength but are unchanged.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.00	$8.00
Rails, scrap	10.00	10.00
No. 1 wrought	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate	7.00	7.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	6.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	19.00
Axles, wrought iron	16.00	21.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels	....	14.50
Malleable	....	13.00
	Per Net Ton	
No. 1 machinery cast	15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

St. Louis

Steel Demand Continues in Good Volume —Pig Iron Quieter

ST. LOUIS, Feb. 28.—Buying of pig iron was light during the week, a natural result of recent heavy buying by melters. The Granite City maker sold about 2500 tons, including 1000 tons to a car builder in the district and 500 tons to a glass factory for use in making molds. The leading Southern maker sold about 300 tons and Chicago interests sold about 400 tons. The malleable foundries are especially busy. Some of the stove plants are well engaged, while with others business is only fair. The pig iron market is firm.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25 f.o.b. Granite City, Ill.	$19.50 to $20.00
Northern No. 2 fdy., delivered St. Louis	20.66
Southern No. 2 fdy., delivered	20.42
Northern malleable, delivered	20.66
Northern basic, delivered	20.66

Freight rates: 81c. from Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets (No. 24)	4.50c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.75c.
Boiler rivets	3.75c.
	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	70
Less than 100 lb	65
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, square, blank or tapped, 200 lb. or more	60
Less than 200 lb	50
Hot-pressed nuts, hexagons, blank or tapped, 200 lb. or more	60
Less than 200 lb	50

Coke.—Continued cold weather is helping dealers to reduce their piles of domestic coke. The demand for industrial grades is fairly good. Prices are unchanged.

Finished Iron and Steel.—New business and specifications against contracts are reaching the Granite City steel mill in ample volume to warrant the operation of the plate, sheet and tin plate mills to full capacity. Prices are reported to be firm. Jobbers report a slight improvement in business in the Oklahoma oil fields, with the volume from other sections only fair. Texas jobbers, it is learned, are complaining of dull business, although they expect an improvement within the next 60 days. Business is slow with the fabricators of structural steel.

Old Material.—Steel grades in the list of old materials are steady and unchanged. Foundry grades, however, are weak and lower from 25c. to $1 a ton because of heavy shipments and a lack of interest among consumers, who seem to be well supplied. Railroad lists include: Union Pacific, 13,529 tons; Chicago, Burlington & Quincy, 5044 tons; Big Four, 700 tons and 14 carloads; Chicago, Milwaukee & St. Paul, 141 carloads; Mobile & Ohio, 35 carloads; Pullman Co., St. Louis, 21 carloads; Nickel Plate, 21 carloads; Standard Oil Co., (Woodriver) 4 carloads scrap and 11,500 pounds of metals.

Prices per gross ton f.o.b. dealers' yards and delivered St. Louis district consumers' works:

Heavy melting steel	$11.75 to $12.25
No. 1 locomotive tires	12.75 to 13.25
Heavy shoveling steel	11.75 to 12.25
Miscellaneous standard-section rails, including frogs, switches and guards, cut apart	14.00 to 14.50
Railroad springs	14.50 to 14.75
Bundled sheets	8.75 to 9.25
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	9.75 to 10.25
Cast iron borings	9.00 to 9.50
Iron rails	13.00 to 13.50
Rails for rolling	14.25 to 14.75
Machine shop turnings	7.50 to 8.00
Steel car axles	19.50 to 20.00
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	21.00 to 21.50
No. 1 railroad wrought	10.00 to 10.50
Steel rails, less than 3 ft	15.75 to 16.25
Steel angle bars	12.50 to 13.00
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	14.00 to 14.50
Railroad malleable	11.00 to 11.50
No. 1 railroad cast	13.50 to 14.00
Stove plate	13.00 to 13.50
Agricultural malleable	12.00 to 12.50
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00

Detroit

Automobile Production Increases—Steel Business Reflects Improvement

DETROIT, Feb. 28.—Industrial production volume continues upward and steel bookings reflect the increase. The automobile industry continues to lead in progress, as typified for instance by the manner in which Chevrolet production schedule for January had to be stepped up on six different occasions from Nov. 17, when 72,058 units were planned, until the latter part of January, when better than 91,000 units were ordered. This company's projected schedule for March is 127,000 units, which, if realized, will be the peak month in the company's history.

A third assembly line has just been put into commission by the new Pontiac plant of the General Motors Corporation, which will increase its capacity 50 per cent. Willys-Overland's projected March schedule is announced as 40,000 units, with 80,000 cars of all types to be turned out during the first quarter. February production for Graham-Paige will amount to 37,000 units, which is an increase of about 76 per cent over last month.

Ford production is still increasing, as evidenced by consistent building up of the payroll, the weekly increase being about 700 employees. Ford has suspended the manufacture of Fordson tractors temporarily, but will continue the manufacture of parts to service the 600,000 tractors now in use. A considerable number of tractors had been completed during the in-

terval when production was suspended on the passenger cars.

Employment generally in Detroit is still increasing at about 2000 a week. As compared with this same period a year ago, employment now shows an increase of about 13,500.

Steel prices remain firm. Structural bookings have shown a slight increase in the last 10 days, mostly in small-lot bookings.

The market on old material in this district has registered further declines during the past week, in most cases 50c. per ton. One of the main weakening factors is the announcement by one of the largest users of blast furnace material that it is discontinuing the use of scrap.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Heavy melting and shoveling steel	$11.25 to $11.75
Borings and short turnings	7.75 to 8.25
Long turnings	7.00 to 7.50
No. 1 machinery cast	14.50 to 15.50
Automobile cast	19.00 to 20.50
Hydraulic compressed sheets	10.25 to 10.75
Stove plate	11.50 to 12.50
No. 1 busheling	9.00 to 9.50
Sheet clippings	7.00 to 7.50
Flashings	9.50 to 10.00

San Francisco

Business in Structural Steel and Cast Iron Pipe Fairly Active

SAN FRANCISCO, Feb. 25 (*By Air Mail*).—Business during the past week was interrupted to some extent by the Iron and Steel Conference at Del Monte on Feb. 17 and 18 and the Washington's Birthday holiday. However, a fair volume of tonnage was reported placed, structural shapes being the most active. General conditions on the Pacific Coast are considered good for this season and a large amount of work which will require round specifications of steel is in sight.

Pig Iron.—Some improvement is reported in the rate of foundry operations, but as most melters have sufficient stocks on hand to carry them over the next six weeks, buying of iron continues limited. No change in prices is noted.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah foundry, sil. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sil. 2.75 to 3.25	24.00 to 25.00
**German foundry, sil. 2.75 to 3.25	24.25

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—The largest structural award of the week called for 280 tons for a hotel in San Francisco. Awards exceeded 1000 tons, the majority of them being confined to lots around 150 tons. Inquiries include 480 tons for an addition to the Heinz plant in Berkeley. An award is expected next week on 4000 tons for underframes for 2000 refrigerator cars for the Pacific Fruit Express. Pending business calls for over 17,000 tons. Prices remain firm at 2.35c., c.i.f. Coast ports.

Plates.—Some fair-sized lots are up for figure. The only sizable award this week involved 170 tons of universal plates for the Western Pacific at San Francisco, placed with unnamed Eastern producers. The Standard Oil Co., San Francisco, rejected all bids on its inquiry for an oil tanker requiring 3500 tons of plates and 1500 tons of shapes. New specifications are to be prepared. Bids were returned unopened on the 2000 ton penstock at Seattle and new specifications are also to be prepared. Pending business exceeds 4000 tons. Prices are firm at 2.30c., c.i.f.

Bars.—Reinforcing steel bar awards totaled more than 1700 tons. The largest involved 700 tons for an apartment in Los Angeles. Los Angeles will open bids March 12 for the construction of Drainage District No. 23, involving 5000 tons of bars.

Cast Iron Pipe.—Some improvement is noted in the demand for cast iron pipe and awards were more numerous. The largest letting was to the American Cast Iron Pipe Co. by Los Angeles and called for 1055 tons of 8-in. class 350 pipe. The Pacific States Cast Iron Pipe Co. took 909 tons of 6-in. class 350 for the same city. The Miracle Construction Co., San Diego, secured 156 tons of 4 to 8-in. class B pipe for the improvement of Pacific Street, Oceanside, Cal. Bids were opened this week on 137 tons of 4 to 10-in. class 150 for Modesto, Cal. James Young, Oakland, Cal., took 145 tons of 4 and 6-in. class B for the State Fair Grounds at Sacramento. The United States Cast Iron Pipe & Foundry Co. was low bidder on 128 tons of 48-in. class A for the north outfall sewer at Los Angeles. Bids have been opened on 3095 tons of 4 to 12-in. class B for Southgate, Cal., and on 222 tons of 4 to 8-in. class B for Armona, Cal. Santa Barbara, Cal., will open bids March 1 for 663 tons of 6 to 12-in. classes B and C pipe. Tacoma, Wash., opened bids Feb. 27 for 188 tons of 20-in class C. Bids were returned unopened on 426 tons of 4 to 12-in. for the improvement of Saturn Avenue, Huntington Park, Cal. Bids were opened on 136 tons of 18-in. class C for San Diego.

Coke.—Demand reflects the quiet condition in the pig iron market. Sales and inquiries were limited to small lots.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and structural shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.95c.
Blue annealed sheets (No. 10)	3.90c.
Galvanized sheets (No. 24)	5.50c.
Structural rivets, ½-in. and larger	5.65c.
Common wire nails, base per keg	$3.40
Cement coated nails, 100-lb. keg	3.40

Buffalo

Pig Iron Inquiry Fairly Active—Steel Mill Operation High

BUFFALO, Feb. 28.—Pig iron inquiry this week includes 2000 tons of foundry iron for Port Chester, N. Y., and 1500 tons of foundry for the Crane Co., Bridgeport, Conn. The Kensington-Davis foundry of Buffalo has purchased 2000 tons of foundry iron. An inquiry from New England is for 1000 tons of foundry. Considerable iron remains to be bought for the second quarter. The price situation appears to be growing firmer, and there is talk of higher quotations. No. 2 plain remains at $17, furnace, in the district and at $16.50, furnace, for shipment to points outside the immediate Buffalo territory.

Prices per gross ton, f.o.b. furnace:

No. 2 plain fdy., sil. 1.75 to 2.25	$17.00
No. 2X foundry, sil. 2.25 to 2.75	17.50
No. 1X foundry, sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	$17.00 to 17.50
Basic	16.50 to 17.00
Lake Superior charcoal	27.28

Finished Iron and Steel.—Mill operation continues high, though one of the largest interests has temporarily cut its open-hearth activity from 21 to 18 furnaces to make repairs. The Bethlehem price on bars, shapes and plates may be advanced to 2c., Lackawanna. Sheet business, particularly automobile body sheet, is continuing in volume with this quotation firm at 4.15c., Pittsburgh. A 700-ton reinforcing bar job for a Marcy, N. Y., hospital has been let to a local producer. Seven more Erie County bridges will require 100 tons of reinforcing bars and a new building for the Trico Products

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-finished flats, squares and hexagons	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	$3.65
Black wire, base per 100 lb	3.90

Co., requiring 200 tons, is up for bids. Bolt and nut business is fair, with operation of mills unchanged.

Old Material.—No new sales are reported, but one of the largest consumers is expected to enter the market within a few days, though this concern is said to have a stockpile of about 65,000 tons. New York Central, Erie, Pennsylvania and Michigan Central railroad lists are due to close this week. Machine shop turnings and cast iron borings are off slightly.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$14.75 to $15.25
No. 2 heavy melting steel	13.00 to 13.50
Scrap rails	13.75 to 14.25
Hydraulic compressed sheets	13.25 to 13.75
Hand bundled sheets	9.00 to 9.50
Drop forge flashings	12.00 to 12.50
No. 1 busheling	13.25 to 13.75
Heavy steel axle turnings	12.75 to 13.25
Machine shop turnings	8.50 to 9.00
Acid Open-Hearth Grades	
Railroad knuckles and couplers	16.00 to 16.50
Railroad coil and leaf springs	15.50 to 16.00
Rolled steel wheels	15.75 to 16.25
Low phosphorus billet and bloom ends	17.00 to 17.50
Electric Furnace Grades	
Heavy steel axle turnings	12.75 to 13.25
Short shoveling steel turnings	11.00 to 11.50
Blast Furnace Grades	
Short shoveling steel turnings	10.75 to 11.00
Short mixed borings and turnings	10.50 to 11.00
Cast iron borings	10.00 to 10.50
No. 2 busheling	9.00 to 9.50
Rolling Mill Grades	
Steel car axles	17.00 to 17.50
Iron axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Cupola Grades	
No. 1 machinery cast	14.50 to 15.00
Stove plate	13.00 to 13.25
Locomotive grate bars	11.50 to 12.00
Steel rails, 3 ft. and under	17.00 to 17.25
Cast iron carwheels	13.00 to 13.50
Malleable Grades	
Railroad	15.50
Agricultural	15.50
Industrial	15.50

Boston

Pig Iron Slightly Firmer in Price—Scrap Prices Tend Downward

BOSTON, Feb. 28.—Pig iron sales in the past week approximated 4500 tons made up of small tonnages. While the general price situation is firmer, any advance is checked by one Buffalo furnace, which continues to accept business at 50c. to $1 a ton under the $17 base established by other Buffalo stacks. Open inquiries, which probably will be closed this week, include 800 tons of No. 2 plain and 1000 tons of No. 2X for a Providence, R. I., foundry; 1000 tons of No. 2X and 500 tons of No. 1X wanted by a Connecticut plant; and 2000 tons required by a Port Chester, N. Y., foundry, a total of 5300 tons. It is reported that much of the iron placed in New England so far this year was bought in advance of actual needs, and that on the present basis of melt large consumers have sufficient iron to last through the second quarter. February will be the largest month in sales for the Mystic Iron Works since it began operations.

Prices of foundry iron per gross ton, delivered to most New England points:

Buffalo, sil. 1.75 to 2.25	$21.41 to $21.91
Buffalo, sil. 2.25 to 2.75	21.41 to 22.41
East. Penn., sil. 1.75 to 2.25	23.15 to 23.65
East. Penn., sil. 2.25 to 2.75	23.65 to 24.15
Virginia, sil. 1.75 to 2.25	25.71
Virginia, sil. 2.25 to 2.75	26.21
Alabama, sil. 1.75 to 2.25	22.91 to 24.77
Alabama, sil. 2.25 to 2.75	23.41 to 25.27

Freight rates: $4.91 from Buffalo, $3.65 from eastern Pennsylvania, $5.21 all rail from Virginia, $6.91 to $8.77 from Alabama.

Importations.—Receipts of foreign pig iron at this port during the first half of February were 696 tons of Indian and 290 tons of Dutch, a total of 986 tons, compared with 1282 tons in the first half of January and 12,350 tons in the first half of February, 1927. Imports of ore were 5893 tons from Algiers and 4365 tons from Tunis, a total of 10,258 tons.

Shapes and Plates.—There is little prospective fabricating work in New England. Seven bridges for Vermont will be figured during the next week, but the tonnage of steel involved is small. Most of the current jobs call for less than 100 tons each. Shapes and plates are now 1.90c. to 2.05c., base, depending on point of shipment, or 2.26½c. to 2.41½c., per 100 lb., base, delivered New England.

Cold-Rolled Strip.—Business in cold-rolled strip steel is not as active as it was a month ago, but is fairly good. The Worcester, Mass., mill is quoting 3.30c. per lb., base, on lots of 1 to 3 tons, and 3.05c. on larger lots.

Coke.—The New England Coal & Coke Co. and the Providence Gas Co. announce that the price of by-product foundry coke on March 1 will remain at $11.50 a ton, delivered within a $3.10 freight rate zone. The movement of foundry coke from ovens is greater than it was a month ago, but only slightly so. Competition between by-product ovens and gas companies for domestic coke business continues keen, and prices on large tonnages are elastic.

Old Material.—Prices on old material tend downward. Actual reductions are noted on steel turnings, mixed borings and turnings, pipe and chemical borings, while inside prices are paid more often than outside prices on all material except heavy melting steel. Efforts to buy No. 1 heavy melting steel at less than $9 a ton on cars, shipping point, have been unsuccessful, and $9 to $9.10 is the usual range. Indications are that 5000 tons of steel scrap for Poland, mentioned last week, will be shipped March 1. It will include automobile steel and cost $9 a ton delivered at dock. Shipments of textile and No. 1 machinery cast to eastern Pennsylvania continue on a fairly large scale, but New England consumers took comparatively little the past week. The Boston & Maine Railroad closed bids Feb. 25 on 65 cars of miscellaneous material and the Boston Elevated Railroad has closed bids on 1500 tons of rails.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$9.00 to $9.10
Scrap T rails	8.75 to 9.00
Scrap girder rails	7.50 to 8.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.50 to 9.00
Machine shop turnings	5.75 to 6.25
Cast iron borings (steel works and rolling mill)	6.00 to 6.25
Bundled skeleton, long	6.00 to 6.50
Forge flashings	6.50 to 7.00
Blast furnace borings and turnings	5.75 to 6.25
Forge scrap	6.00 to 6.50
Shafting	13.00 to 13.50
Steel car axles	15.50 to 16.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.75 to 8.25
Rails for rolling	10.00 to 10.50
Cast iron borings, chemical	9.50 to 10.00
Prices per gross ton delivered consumers' yards:	
Textile cast	$14.00 to $14.50
No. 1 machinery cast	14.50 to 15.00
No. 2 machinery cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Railroad malleable	13.50 to 14.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars and small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway, rounds	6.60c.
Norway, squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold rolled steel—	
Rounds and hexagons	*3.45c. to 5.45c.
Squares and flats	*3.95c. to 6.95c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Cincinnati

Pig Iron Demand Increasing—Sheet Mills Operating at High Rate

CINCINNATI, Feb. 28.—Increasing demand from consumers for foundry iron for current needs is lending strength to the market in this district, despite the fact that buying for second quarter has been practically at a standstill. Sales of 300 tons of Southern iron to a Louisville, Ky., melter and of a like amount of silvery iron to a Michigan consumer were the largest transactions of the week, while an inquiry from the State Reformatory at Pendleton, Ind., for 200 tons of foundry iron is the only pending business calling for more than a single carload. Prices have not been altered. Southern Ohio foundry iron remains at $19, base Ironton, and Tennessee and Alabama iron at $16, base Birmingham. Sellers in northern Ohio are quoting from $16.50 to $17, base Cleveland. On March 1 the American Rolling Mill Co. will blow out one of its furnaces at Columbus. This will leave in operation in southern Ohio three steel plant furnaces producing basic iron, one each at Columbus, Ashland and Portsmouth, and two silvery furnaces at Jackson.

Prices per gross ton, delivered Cincinnati:

So. Ohio fdy., sfl. 1.75 to 2.25....	$20.89
So. Ohio malleable.....$20.14 to	20.89
Alabama fdy., sil. 1.75 to 2.25...	19.69
Alabama fdy., sil. 2.25 to 2.75...	20.19
Tennessee fdy., sil. 1.75 to 2.25..	19.69
Southern Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Announcement by producers of bars, shapes and plates that prices have been advanced $1 a ton to a basis of 1.90c., Pittsburgh, has been followed by active solicitation of second quarter business at that figure. Some mills, however, are making contracts through the first half of the year with large buyers at 1.85c., and others have joined in this practice under pressure exerted by old customers. Sellers admit that consumers are likely to take full advantage of their present lower-priced contracts by specifying all of the tonnage called for. Aside from 1700 tons of structural steel which the Central States Bridge Co., Indianapolis, will supply for a new building of the L. S. Ayres Co., that city, lettings have been of minor importance. However, indications are that much new work will come out in the next 30 days. Meanwhile, most fabricating shops in this district are operating on curtailed schedules. In the sheet market, specifications have been of substantial proportions and buyers are paying the present scale of prices for material to be delivered in the second quarter. No deviation from the scale of 2.10c., base Pittsburgh, for blue annealed, 2.90c. for black, 3.75c. for galvanized and 4.15c. for automobile body stock, has been noted. Demand for electrical sheets is the best in many weeks.

Reinforcing Bars.—Prices continue to show an upward trend, and makers of new billet bars are now asking from 1.90c. to 2c., base Pittsburgh, an increase of from $1 to $2 a ton. Rail steel stock is being sold at 1.80c., base mill, although concessions of $1 a ton are being made on large tonnages.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and structural shapes....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforcing bars.....	3.15c.
Rail steel reinforcing bars.....	3.00c.
Hoops	4.00c. to 4.25c.
Bands	3.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue annealed sheets (No. 10)...	3.60c.
Structural rivets	3.85c.
Small rivets .....65 per cent off list	
No. 9 annealed wire, per 100 lb.....$3.00	
Common wire nails, base per keg.....	2.95
Cement coated nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.....$18.00	
4-in.	38.00
Seamless steel boiler tubes, 2-in.....	19.00
4-in.	39.00

Coke.—During March by-product foundry coke will remain unchanged at $7.50 per net ton, f.o.b. ovens, or $9.52 delivered here. The schedule for domestic grades also will be continued on the present basis, egg size selling at $5.50, ovens, walnut at $5 and No. 2 nut at $4.50. In Michigan the present price structure will not be disturbed, quotations at Detroit ovens holding over for another 30 days on both foundry and domestic by-product coke.

Foundry coke prices per net ton, delivered Cincinnati: By-product coke, $9.52 to $9.64; Wise County coke, $7.59 to $8.09; New River coke, $10.09 to $10.59. Freight rates, $2.14 from Ashland, Ky.; $2.59 from Wise County and New River ovens.

Old Material.—The market for steel mill grades of material has been rather listless in view of the better situation from a production standpoint at nearby mills. On the other hand, foundry items are slightly stronger, but prices are unchanged.

Dealers' buying prices per gross ton f.o.b. cars, Cincinnati:

Heavy melting steel.....$11.50 to	$12.00
Scrap rails for melting..... 12.25 to	12.75
Loose sheet clippings..... 9.00 to	9.50
Bundled sheets ..... 9.50 to	10.00
Cast iron borings..... 8.50 to	9.00
Machine shop turnings..... 8.00 to	8.50
No. 1 busheling..... 10.50 to	11.00
No. 2 busheling..... 7.50 to	8.00
Rails for rolling..... 13.00 to	13.50
No. 1 locomotive tires..... 13.50 to	14.00
No. 1 railroad wrought..... 11.00 to	11.50
Short rails ..... 16.50 to	17.00
Cast iron carwheels..... 12.75 to	13.25
No. 1 machinery cast..... 16.00 to	17.00
No. 1 railroad cast..... 13.50 to	14.00
Burnt cast ..... 8.00 to	8.50
Stove plate ..... 9.00 to	9.50
Brake shoes ..... 10.00 to	10.75
Railroad malleable ..... 12.75 to	13.25
Agricultural malleable ..... 12.25 to	12.75

Pacific Northwest

Prices Higher on Several Steel Products Outlook Encouraging

SEATTLE, Feb. 25 (*By Air Mail*).—Local sales agents for Eastern steel mills and jobbers report they are figuring on a large amount of new work and seem much encouraged by the outlook. Prices are firmer than for some time, and 2.30c., Seattle, on plates is said to be minimum, while reinforcing bars have gone up $2 per ton, and are now reported firm at 2.20c., Seattle, for large lots, and up to 3c. for small lots. Local building permits for February will exceed $4,000,000, a record for any month.

Pig Iron.—Sales of small lots of foundry iron, some from Utah and some Indian iron, represent all that is doing in the local market. Utah basic and No. 2 foundry are quoted at $24 to $25 per gross ton, delivered Seattle.

Shapes.—Awards in the past two weeks have been small, the largest job having been about 1200 tons for the Stimson Building in Seattle, taken by the Wallace Bridge & Structural Steel Co. The Northern Pacific Railroad is inquiring for 550 tons for two bridges. Plain material is firm at 2.35c., Seattle.

Plates.—Bids are to open on Feb. 27 on 1000 tons for a water line at Tacoma, Wash. Another pipe line involving about 1000 tons will be in the market shortly. Plates are firm at 2.30c., Seattle.

Cold-Finished Steel Bars.—Local sales representatives of Eastern mills and jobbers have advanced prices $2 per ton, and now quote at 2.90c. to 3c., base, Seattle.

Sheets.—Prices on all grades of sheets have been advanced in the local market from $2 to $3 per ton, and the market is firm at the higher prices.

Wire Products.—Prices on wire and wire nails have been advanced about $3 per ton, but demand is quiet. Wire nails are now quoted at $3 to $3.10 per 100-lb. keg, delivered Seattle.

Old Material.—Sales are only for very small lots, the leading local consumer being filled up on its scrap needs for some months. Heavy melting scrap is $10.50 to $11 per gross ton; country scrap, $8 per net ton; cast iron scrap, $13 per net ton, and borings about $5 per gross ton, delivered Seattle.

NON-FERROUS METAL MARKETS

The Week's Prices

Cents per Pound for Early Delivery

	Feb. 28	Feb. 27	Feb. 25	Feb. 24	Feb. 23	Feb. 21
Lake copper, New York	14.20	14.20	14.20	14.20	14.20	14.25
Electrolytic copper, N. Y.*	13.75	13.75	13.75	13.75	13.75	13.75
Straits tin, spot, N. Y.	51.75	52.37½	....	51.87½	51.50	51.37½
Lead, New York	6.15	6.15	6.25	6.25	6.25	6.25
Lead, St. Louis	5.90	5.90	6.00	6.00	6.00	6.00
Zinc, New York	5.80	5.80	5.77½	5.77½	5.77½	5.80
Zinc, St. Louis	5.45	5.45	5.42½	5.42½	5.42½	5.45

*Refinery quotation; delivered price ¼c. higher.

NEW YORK, Feb. 28.—Unusual inactivity is reported by sellers in all markets. Prices have declined in several. Copper is nominally unchanged and tin is a little higher. Both lead and zinc have fallen to new low levels for some years.

Copper.—"Near stagnation" is a fair description of the market. Very little inquiry for domestic or foreign consumption is reported. What little buying has been done has been satisfied at 14c., delivered in the Connecticut Valley, which is a concession by one or two sellers from the quotation of 14.12½c., maintained firmly by all large producers. There has been no change in the quotation of Copper Exporters, Inc., which still stands at 14.50c., c.i.f. usual European ports. An encouraging feature is the fact that prices hold firm in the face of weakness in other metals. Lake copper is very quiet at 14.20c., delivered.

Tin.—In spite of a holiday in the middle of the week, sales for the week ended Saturday, Feb. 25, were fairly good at about 900 tons. Dealers did most of the buying, but it is believed consumers still have considerable metal to purchase for April-May. Buying has not been aggressive and the market for the most part has been heavy and sluggish. Yesterday in a quiet market less than 100 tons changed hands and today there has been very little business. Spot Straits tin was quoted today at 51.75c. New York, and prices in London were slightly higher than a week ago, with spot standard quoted at £231 5s., future standard at £233 17s. 6d., and spot Straits at £235 5s. per ton. The Singapore price today was £238 2s. 6d. Arrivals thus far this month have been 4520 tons, with 7995 tons reported afloat.

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	53.50c. to 54.50c.
Tin, bar	55.50c. to 56.50c.
Copper, Lake	15.25c.
Copper, electrolytic	15.00c.
Copper, casting	14.25c.
Zinc, slab	6.75c. to 7.25c.
Lead, American pig	7.25c. to 7.75c.
Lead, bar	9.25c. to 10.25c.
Antimony, Asiatic	12.75c. to 13.25c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure)	27.00c. to 28.00c.
Aluminum ingots, No. 12 alloy	26.00c. to 27.00c.
Babbitt metal, commercial grade	30.00c. to 40.00c.
Solder, ½ and ½	34.50c. to 35.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig	58.00c.
Tin, bar	60.00c.
Copper, Lake	15.25c.
Copper, electrolytic	15.25c.
Copper, casting	14.50c.
Zinc, slab	7.50c.
Lead, American pig	6.95c.
Antimony, Asiatic	16.00c.
Lead, bar	9.25c.
Babbitt metal, medium grade	19.50c.
Babbitt metal, high grade	63.00c.
Solder, ½ and ½	34.50c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	18.50c. to 19.25c.
Copper, hot rolled	22.75c. to 23.75c.
Copper, cold rolled, 14 oz. and heavier	25.25c. to 26.25c.
Seamless Tubes—	
Brass	23.37½c. to 24.37½c.
Copper	24.50c. to 25.50c.
Brazed Brass Tubes	26.50c. to 27.50c.
Brass Rods	16.25c. to 17.25c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.00c. to 10.50c.
Zinc sheets, open	10.50c. to 11.00c.

Lead.—Two changes in the quotation of the leading interest have been made in the last week—from 6.35c. to 6.25c. on Feb. 21 and then to 6.15c. yesterday, Monday, Feb. 27. Quotations in the West are nominal at 5.90c. St. Louis. Buying is only moderate with the bulk for early shipment. Inquiry is a little better in some quarters.

Zinc.—Prime Western zinc sold the past week as low as 5.40c. St. Louis, or 5.75c., New York, which is the lowest since July 1, 1922. This was for spot delivery. The market today, after sagging during the week as low at 5.42½c., St. Louis, for early delivery, is quoted at 5.45c., St. Louis, or 5.80c., New York. The slight firmness is due probably to the knowledge that production has definitely declined. A satisfactory quantity of metal is moving to consumers and sales are moderate. February metal in weak hands has been pretty well absorbed. Ore is still $35, Joplin, with production last week about 12,500 tons and sales about 9200 tons. Stocks are close to 54,000 tons.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c., with shot nickel at 36c., and electrolytic nickel at 37c. per lb.

Antimony.—Weakness in other metals, particularly lead, has affected this market and Chinese metal for spot delivery is quoted lower at 10.25c. and futures at 10.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 23.90c. per lb. delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Feb. 28.—Prices are weak following unloading of resale materials. Sales in old metals are unusually small and many prices are lower.

Prices, per lb., in carload lots: Lake copper, 14.25c.; tin, 53.50c.; lead, 6.05c.; zinc, 5.55c.; in less-than-carload lots, antimony, 12.50c. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.;

Non-Ferrous Rolled Products

Zinc sheets were reduced ½c. per lb. on Feb. 27 after having been quoted at 10c. since Aug. 5. Lead full sheets are now being quoted at 9.75c. to 10c., a ¼c. reduction having been made effective Feb. 21. There have been no changes in the mill prices on bronze, brass and copper products since Dec. 5.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass	18.75c.
Copper, hot rolled	22.75c.
Zinc	10.00c.
Lead (full sheets)	10.00c. to 10.25c.
Seamless Tubes—	
High brass	23.62½c.
Copper	24.50c.
Rods—	
High brass	16.50c.
Naval brass	19.25c.
Wire—	
Copper	15.75c.
High brass	19.25c.
Copper in Rolls	21.75c.
Brazed Brass Tubing	26.75c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Consumers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	18.75c.
Copper, hot rolled	22.75c.
Copper, cold rolled, 14 oz. and heavier	25.00c.
Zinc	11.00c.
Lead, wide	9.75c.
Seamless Tubes—	
Brass	25.12½c.
Copper	26.00c.
Brazed Brass Tubes	26.75c.
Brass Rods	16.50c.

copper bottoms, 9.50c.; red brass, 9.25c.; yellow brass, 7c.; lead pipe, 4.75c.; zinc, 3.25c.; pewter, No. 1, 30c.; tin foil, 36c.; block tin, 45c.; aluminum, 11.75c.; all being dealers' prices for less-than-carload lots.

REINFORCING STEEL

Awards of 7200 Tons—1500 to 2000 Tons Pending for Illinois Road Work

THE week's awards amounted to 7200 tons, the largest of which was 1000 tons for a warehouse in New York. Inquiries totaled 3150 tons, 1500 to 2000 tons of which will be required for road work in Illinois. Awards follow:

CRANSTON, R. I., 450 tons, sewage disposal, to Barker Steel Co.

CAMBRIDGE, MASS., 250 tons, apartment building, to Concrete Steel Co.

BOSTON, 100 tons, stores on Newbury Street, to Barker Steel Co.

NEW YORK, 1000 tons, Green building; from Turner Construction Co., general contractor, to Jones & Laughlin Steel Corporation.

NEW YORK, 100 tons, building for American Women's Realty Co., to Fireproof Products Co.

BROOKLYN, 150 tons, warehouse for United Grocers Co., to Igoe Brothers.

FAR ROCKAWAY, N. Y., 100 tons, additional work on bathing pavilion, to Igoe Brothers.

NEWARK, 150 tons, Hoffman Beverage warehouse, to Faitoute Iron & Steel Co.

CLEVELAND, 125 tons, pathological laboratory for Western Reserve University, to Bourne-Fuller Co.

CLEVELAND, 450 tons, sales building for Cleveland Packard Co., to Bourne-Fuller Co.

CLEVELAND, 600 tons, factory extension for Richman Brothers Co., to Bourne-Fuller Co.

STATE OF ILLINOIS, 720 tons of rail steel bars for road work; 500 tons to Truscon Steel Co., and 220 tons to Inland Steel Co.

CHICAGO, 750 tons, building for Commonwealth Edison Co., to an unnamed bidder.

CHICAGO, 100 tons, Sherman shops, to American System of Reinforcing.

CHICAGO, 150 tons, apartment building at 1320 Astor Place, to American System of Reinforcing.

CHICAGO, 170 tons of rail steel bars, two apartment buildings, to Olney J. Dean & Co.

ST. LOUIS, 150 tons, office building for Lindell Trust Co., to Missouri Rolling Mills Corporation.

CEDAR RAPIDS, IOWA, 650 tons, addition to plant of Quaker Oats Co., to Laclede Steel Co.

LOS ANGELES, 700 tons, apartment building, Argyle and Franklin Streets, to unnamed interest.

OAKLAND, CAL., 275 tons, warehouse, Ninth and Castro Streets, to Badt-Falk Co.

SEATTLE, 100 tons, market building on Broadway, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 150 tons for North Station.

CHICAGO, 350 tons, Steuben Club.

OAK PARK, ILL., 650 tons for Nicholas stores.

SPRINGFIELD, ILL., 1500 to 2000 tons, road work for Illinois Highway Commission; bids opened Feb. 28.

Stockholders of the Stanley Works, New Britain, Conn., have authorized the sale of the company's plant at Bridgewater Junction, Mass. There is no prospective purchaser, the authorization being a formality. The principal part of the Massachusetts plant's business was moved to Bridgeport, Conn., about a year ago.

Old Metals, Per Lb., New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators and the selling prices are those charged consumers after the metal has been properly prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	12.00c.	13.50c.
Copper, heavy and wire	11.75c.	12.875c.
Copper, light and bottoms	10.00c.	11.25c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	9.50c.	10.625c.
No. 1 yellow brass turnings	7.75c.	9.00c.
No. 1 red brass or composition turnings	8.75c.	9.75c.
Lead, heavy	5.00c.	5.50c.
Lead, tea	4.00c.	4.50c.
Zinc	3.50c.	4.00c.
Sheet aluminum	12.50c.	14.50c.
Cast aluminum	12.50c.	14.50c.

RAILROAD EQUIPMENT

St. Paul Road Inquires for 4650 Freight Cars—2000 Refrigerator Cars Ordered

OUTSTANDING in the developments of the week is the inquiry for 4650 freight cars by the Chicago, Milwaukee, St. Paul & Pacific. The Pacific Fruit Express has purchased 2000 refrigerator cars and the Fruit Growers Express will buy 1200 underframes. The only locomotive order of size is that of the Union Pacific for 23. Details of the week's business follow:

Illinois Central will buy 10 motor and 10 trailer cars.

Chicago, Milwaukee, St. Paul & Pacific will accept bids on March 8 for 4650 freight and 10 baggage cars. Freight cars will be of the following types: 2500 50-ton box, 1000 70-ton hopper, 650 40-ton stock, 300 automobile and 200 ore cars.

Fruit Growers Express has made inquiry for 1200 underframes.

Pacific Fruit Express has placed orders for 2000 refrigerator cars, 1000 with Pullman Car & Mfg. Corporation and 1000 with Pacific Car & Foundry Co.

Booth & Flinn, Pittsburgh, have purchased 30 to 32 garbage cars for use in Detroit from Bethlehem Steel Co.

Union Pacific has ordered 23 4-12-2 type locomotives and 15 additional tenders from American Locomotive Co.

Standard Oil Co. of New Jersey is inquiring for 10 tank cars for export.

Wheeling Steel Corporation has ordered 16 air dump cars from Koppel Industrial Car & Equipment Co.

Paulista Railway of Brazil is inquiring for seven sleeping cars.

New York, Chicago & St. Louis has ordered one private car from Pullman Car & Mfg. Corporation.

South Manchurian Railway is inquiring for 20 air dump cars of 45 cu. yd. capacity.

Conley Tank Car Co. has ordered 50 40-ton tank cars from American Car & Foundry Co.

St. Louis-San Francisco will buy 250 underframes.

North American Car Corporation is in the market for 200 poultry cars.

St. Louis Coal & Coke Corporation Announces Changes

ST. LOUIS, Feb. 28.—The general sales offices of the St. Louis Gas & Coke Corporation have been removed from 208 South LaSalle Street, Chicago, to 1502 Telephone Building, St. Louis, it was announced here today by M. D. Curran, president, who also made public the resignation of Walter H. Underwood as general sales manager and the appointment of J. C. Gore as the latter's successor. Mr. Underwood has been general sales manager of the present company and its predecessors since 1921, having been previously with Domhoff & Joyce, Cincinnati. Mr. Gore was with the latter company for 12 years before joining the St. Louis concern as general sales agent at Chicago in 1922. For five years he has been assistant sales manager, first at Chicago and since July 1, 1927, at St. Louis.

FABRICATED STRUCTURAL STEEL

Chicago Garage Will Take 8000 Tons—Awards and Inquiries in Low Volume

AWARDS of slightly more than 21,800 tons, although somewhat above last week's total, were considerably less than the weekly average of the last two months. Inquiries totaling 25,400 tons were a little over half of last week's figure and included 8000 tons for a garage at Chicago. Awards follow:

WORCESTER, MASS., 250 tons, Nurses' Home, to unnamed fabricator.

WEYMOUTH, MASS., 123 tons, town office building to Palmer Steel Co.

BOSTON, 270 tons, Columbus Avenue bridge for Boston & Albany Railroad, to Boston Bridge Works, Inc.

NEW YORK, 2300 tons, loft building at 228-36 East Forty-fifth Street, to McClintic-Marshall Co.

NEW YORK, 1600 tons, loft building at Thirty-fifth Street and Eighth Avenue, to Harris Structural Steel Co.

NEW YORK, 800 tons in the following awards as reported to the Structural Steel Board of Trade: National City Bank at 85 Main Street, Flushing, and alteration and addition for Best & Co., to Hay Foundry & Iron Works; apartment building at 69-73 East Seventy-seventh Street, to George A. Just Co.

LAKEVILLE, N. Y., 400 tons, school, to an unnamed local fabricator.

JERSEY CITY, 300 tons, tanks for Standard Oil Co. of New Jersey, to an unnamed fabricator.

PHILADELPHIA, 3000 tons, Integrity Trust Co. building, to McClintic-Marshall Co.

CAMDEN, N. J., 200 tons, Camden Rail & Harbor warehouse, to Bethlehem fabricators.

CAMDEN, 600 tons, bank building, to American Bridge Co.

CHESAPEAKE & OHIO RAILWAY, 150 tons, bridges, to American Bridge Co.

PENNSYLVANIA RAILROAD, 125 tons, bridge, to McClintic-Marshall Co.

BELLE, W. VA., 700 tons, plant building for E. I. duPont de Nemours & Co., to McClintic-Marshall Co.

PITTSBURGH, 115 tons, gates for Lock No. 6, Allegheny River, to Independent Bridge Co., Pittsburgh.

RITTMAN, OHIO, 400 tons, factory building for Ohio Box Board Co., to Forest City Structural Steel Co.

CLEVELAND, 125 tons, sales building for Cleveland Packard Co., to T. H. Brooks Co.

CLEVELAND, 2100 tons, extension to open-hearth plant of Otis Steel Co., to Wellman-Seaver-Morgan Co.

CLEVELAND, 720 tons, Whitehouse grade crossing elimination work, awarded by Ohio Highway Commission to McClintic-Marshall Co.

CLEVELAND, 135 tons, conveyor house for Kelly Island Lime & Transport Co. at Marblehead, Ohio, to Reliance Structural Steel Co.

CLEVELAND, 200 tons, new plant for Steel Improvement & Forge Co., to Truscon Steel Co.

INDIANAPOLIS, 1700 tons, building for L. S. Ayres Co., to Central States Bridge Co., Indianapolis.

MILWAUKEE, 7400 tons, Sixteenth Street viaduct; previously reported taken by Julius C. Theilacker, who has placed 6000 tons with American Bridge Co. and 1400 tons with Milwaukee Bridge Co.

CHICAGO, 600 tons, apartment building at 1320 Astor Street, to Midcity Foundry Corporation, local.

JOLIET, ILL., 110 tons, building for Gerlach-Barklow Co., to American Bridge Co.

AMARILLO, TEX., 1800 tons, office building for Santa Fe railroad, to an unnamed bidder.

FLINT, MICH., 700 tons, building for Chevrolet Motor Co., to Mahon Structural Steel Co.

ST. LOUIS, 200 tons; 100 tons for pumping station in connection with City Sanitarium, and 100 tons for gymnasium for metropolitan police, to Mississippi Valley Structural Steel Co.

SAN FRANCISCO, 170 tons, apartment building at Laguna and Sacramento Streets, to McClintic-Marshall Co. Central Works.

SAN FRANCISCO, 100 tons, apartment building at Lombard and Polk Streets, to McClintic-Marshall Co. Central Works.

SAN FRANCISCO, 280 tons, hotel at Eddy and Jones Streets, to Judson-Pacific Co.

SAN FRANCISCO, 115 tons, theater at Chestnut and Steiner Streets, to Pacific Structural Iron Works.

SAN FRANCISCO, 125 tons, Native Daughters of Golden West hall, to McClintic-Marshall Co. Central Works.

BERKELEY, CAL., 500 tons, factory building for H. J. Heinz Co., to Austin Co.

DALY CITY, CAL., 127 tons, theater, to Dyer Brothers.

SAN DIEGO, 700 tons, power house for Byllesby Engineering & Management Corporation, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

NEW YORK, 500 tons, building for New York Geneological Society.

STATE OF NEW JERSEY, 200 tons, highway bridge over Passaic River.

EAST LIBERTY, PA., 1200 tons, theater.

COVINGTON TOWNSHIP, PA., 167 tons, County bridge over Tioga River, bids opened Feb. 29.

KINGSTON, PA., 500 tons, Wyoming Seminary building, previous bids rejected and new bids asked.

KINGSTON, 715 tons, armory for Sixty-ninth Field Artillery; Chase Construction Co., Allentown, low bidder for general contract.

PHILADELPHIA, 600 tons, Terminal Title & Trust Co. building, Sixty-ninth and Market Streets, bids opened Feb. 29.

TIOGA, PA., 160 tons, highway bridge.

HAMPTON ROADS, VA., 500 hangars for United States Air Service.

WASHINGTON, 500 tons of plates for Mare Island and Puget Sound Navy Yards, schedule 8499; bids Feb. 28.

CHICAGO, 4000 tons, office building on Michigan Avenue, owner's name not given.

COLUMBUS, OHIO, 100 tons, chemistry building at Ohio State University.

CLINTON, IOWA, 300 tons, plant building for United Gas Improvement Co.

CHICAGO, 8000 tons, garage; Graven & Meager, architects.

SHAWANO, WIS., 700 tons, highway bridge.

OTTAWA, ILL., 1500 tons, building for National Plate Glass Co.

AUSTIN, ILL., 3500 tons, high school.

SPRINGFIELD, ILL., 1124 tons, superstructure for 11 highway bridges for Illinois Highway Commission; bids opened Feb. 28.

SAN FRANCISCO, 5000 tons shapes and plates for Deisel oil tanker, for Standard Oil Co.; bids rejected and new specifications being prepared.

OAKLAND, CAL., 100 tons, hangar No. 37; bids soon.

LOS ANGELES, 110 tons, science building, University of Southern California; general contract to Scofield-Twiats Co.

SEATTLE, WASH., 2000 tons for penstock; bids returned unopened and new specifications will be prepared.

TACOMA, WASH., 900 tons, pipe line; bids Feb. 27.

Empire Officers Named

(*Concluded from page* 623)

Co., Canton, the Massillon Rolling Mill Co. and the Zanesville, Ohio, plant of the American Rolling Mill Co.

F. W. Beach, who has been general sales manager of the Mansfield company, has been appointed Western sales manager of the Empire corporation, with headquarters in Chicago. He was formerly located in that city and has a wide acquaintance in the Chicago territory.

F. F. Huber, Cleveland district sales manager of the Mansfield company, will be promoted to an executive position in the home sales office.

Harold Davey, Detroit district sales manager, will have two assistants, Lawrence Cross, who has been in the sales department of the Empire Steel Co., Cleveland, and Edward Duncan, formerly with the Eastern Rolling Mill Co.

William L. Hoffman, formerly with the Brier Hill Steel Co., who has been Philadelphia district sales manager of the Mansfield company for three years, will remain in the Philadelphia territory as district sales manager of the new company.

Glenn D. East, manager of sales of the Empire Steel Co., Cleveland, and several other men who have been connected with the sales departments of the affiliated companies, will also be given places in the new organization.

Class I railroads on Feb. 8 had 369,469 surplus freight cars in good repair and immediately available for service, according to the Car Service Division, American Railway Association. This was a decrease of 34,323 cars compared with the previous week.

PERSONAL

Dr. Richard Moldenke sailed Saturday, Feb. 25, on the Arabic for Europe. He will visit Germany and other countries on business and will present an exchange paper for the American Foundrymen's Association before the International Foundry Congress, to be held in Barcelona, Spain, April 10 to 14. The congress is confined this year to the foundry associations of Europe.

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C. Naas, with the Packard Motor Car Co., Detroit, for about 20 years, has joined the Sterling Grinding Wheel Co., Tiffin, Ohio, and has been assigned to the Detroit district in a sales capacity.

—

C. H. Kathe, purchasing agent and traffic manager of the Hill Clutch Machine & Foundry Co., Cleveland, has resigned. He has been associated with the company 19 years, 16 years in the above-mentioned capacity.

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Lorimer Dunlevy has resigned as sales manager of the Climax Engineering Co., Clinton, Iowa, and on March 15 becomes general sales manager of the O. E. Szekely Co., Holland, Mich., maker of commercial airplane engines and other products.

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Albert M. Ross, who has been supervisor of production and inventory in the plants of Remington-Rand, Inc., has been made assistant manager of the Remington Typewriter Works, Ilion, N. Y. He succeeds Frank Lewis, who has been transferred to the cabinet and printing division of the Rand-Kardex plant at Tonawanda, N. Y.

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J. C. Bradley, chief metallurgist American Brass Co., New York, will speak on "Manufacture of and Properties of Brass and Nickel Silver," before the Providence Engineering Society at the society rooms in Providence, Thursday evening, March 1.

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W. F. Glaser has been appointed Cleveland district sales manager for the Louis Allis Co., Milwaukee, manufacturer of electric motors. The Cleveland office, a new one, is at 409 Union Building, 1836 Euclid Avenue.

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David L. Sacks has been elected president and treasurer of Louis Sacks, Inc., 357 Wilson Avenue, Newark, N. J., and its affiliated companies, the Louis Sacks Iron Foundry and the Newark Malleable Iron Works. Other officers are David MacIntosh, first vice-president; James O. MacIntosh, second vice-president; Otto H. Mayer, secretary, and Louis E. Adams, assistant treasurer.

—

Marcus Peck has been appointed assistant to the president of the United States Chain & Forging Co., Pittsburgh, and will be in charge of sales. He has been associated with the Standard Oil Co. of California and assumes the duties of Frank L. Campbell, who recently resigned as general sales manager.

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John Howe Hall, metallurgical engineer Taylor-Wharton Iron & Steel Co., High Bridge, N. J., will speak on "Manganese Steel" before the Cincinnati Chapter of the American Society for Steel Treating, Thursday evening, March 1. Slides and a reel of motion pictures will illustrate the lecture.

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W. L. Niekamp, since 1913 president Beck & Corbitt Iron Co., St. Louis jobber, resigned on Feb. 21 and has been succeeded temporarily by Henry Luedinghaus, who has been a director of the company for 15 years. Mr. Luedinghaus also is president of the St. Louis Malleable Casting Co. and the Luedinghaus-Espencheid Wagon Co., manufacturer of farm wagons and motor trucks. Louis H. Josties, private secretary to Mr. Luedinghaus, has been made vice-president and general manager of the Beck & Corbitt company, succeeding George Niekamp, a brother of the former president.

R. C. Bastress, formerly with the Fort Wayne Iron Store Co., Fort Wayne, Ind., has joined the sales organization of the Black & Decker Mfg. Co., Towson, Md., assigned to Indiana and southern Michigan. L. W. Beuhausen, recently with Slocum & Kilburn, New Bedford, Mass., will handle Black & Decker products in western Massachusetts. G. N. McCarthy will represent the company in the Buffalo territory, taking the place of H. B. Austin, who has been transferred to the Chicago district.

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E. O. Johnstone, district sales manager at San Francisco for the American Chain Co., Inc., has been appointed Pacific Coast distributer of Ford chain hoists, manufactured by the Ford Chain & Block Mfg. Co., Philadelphia.

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George R. Bennett has resigned as vice-president and general manager of the Edgar Allen Steel Co., Inc., New York, and will be succeeded on March 1 by V. A. Greene.

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W. E. Mueller has been elected first vice-president of the Mueller Co., Decatur, Ill., succeeding the late Philip Mueller. Robert E. Mueller, chief engineer of the company, has been elected to the board of directors. Phillip Cruikshank has also been elected a director, taking the place of his father, Frank Cruikshank, who will spend several months of this year in foreign travel.

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A. F. Hanly has been appointed manager of Western sales for A. Milne & Co., steel merchants and importers, and will have headquarters at 580 Market Street, San Francisco.

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George H. Atwood has been elected president-treasurer of the Twin City Forge & Foundry Co., Stillwater, Minn. Other officers are J. L. Record, vice-president, and E. A. Merrill, secretary.

—

W. A. Burns, for many years representative at Portland, Ore., for the Atlas Diesel Engine Co., Oakland, Cal., has been transferred to the company's home office.

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George L. Edwards has been made superintendent of the Brazil Machine & Foundry Co., Brazil, Ind.

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James A. Farrell, president of the United States Steel Corporation, and Myron C. Taylor, chairman of the corporation's finance committee, recently made their first inspection of the steel plants in the Chicago area since the death of Judge Gary. The inspection was under the direction of Eugene J. Buffington, president Illinois Steel Co., and G. G. Thorp, vice-president.

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E. A. Lerner has been made president of the Kensington Steel Co., Chicago, manufacturer of manganese steel castings. He has been associated with the Kensington company for 10 years.

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Joseph Page, for several years associated with the New England Coal & Coke Co., Boston, has been made New England representative of Waldo, Egbert & Maltby, Inc., Buffalo.

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N. T. Jones, vice-president Superior Screw & Bolt Mfg. Co., Cleveland, has been elected president of that company, succeeding B. G. Tremaine, Jr., who has become chairman of the board. Mr. Jones is one of the pioneers in the bolt business in Cleveland, with which he has been affiliated for 30 years, and was one of the founders of the Superior company. H. D. Simpkins, secretary, has been made vice-president and has been succeeded as secretary by C. L. Wedow, who will continue his former duties as director of sales. R. H. Flues, Detroit sales representative, has been made a vice-president.

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W. H. Wills, metallurgist Atlas Steel Corporation, Dunkirk, N. Y., was the speaker at the monthly meeting of the Indianapolis chapter of the American Society

for Steel Treating on Feb. 13, his subject being the "Nature and Uses of the Principal Types of Tool Steels."

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J. M. Manley, secretary Cincinnati branch of the National Metal Trades Association, and E. F. DuBrul, general manager National Machine Tool Builders Association, were the principal speakers at a meeting of the Cincinnati chapter of the National Association of Cost Accountants on Feb. 23. Mr. Manley talked on the "Accountants' Interest in Legislation," while Mr. DuBrul discussed "Unintentional Falsification of Accounts."

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Robert Dodd and Thomas Arnold, representatives of a Montreal banking syndicate, have been elected directors of the Algoma Steel Corporation, Sault Ste. Marie, Ont. They have also been elected to the board of the Lake Superior Corporation, of which the Algoma company is a subsidiary, and in which their banking syndicate has recently acquired large stock holdings.

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D. S. Robinson, president Western Foundry & Furnace Co., Tacoma, Wash., has been elected president of the Northwest Furnace Builders' Association. Other officers are W. H. Carston, Majestic Furnace & Mfg. Co., Seattle, vice-president, and Floyd Oles, Manufacturers' Association of Washington, secretary-treasurer.

—

J. T. Whitehead, president Whitehead & Kales Co., Detroit, and Clyde MacCornack, general manager and chief engineer for the Phoenix Bridge Co., Phoenixville, Pa., have been elected to the board of directors of the American Institute of Steel Construction. Their terms will expire in the fall of 1928.

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J. A. Lodwick, formerly general manager industrial department of the American Arch Co., Inc., has been appointed assistant to the president of the Kennedy-Van Saun Mfg. & Engineering Corporation, 2 Park Avenue, New York.

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D. A. Currie, vice-president and general manager Erie Foundry Co., Erie, Pa., has acquired the entire stock holdings of the A. N. Bates estate and thereby has become the dominant interest in the company. Mr. Currie has been identified with the company for almost 22 years, starting as a timekeeper in 1906, advancing to secretary in 1914 and becoming vice-president and general manager in 1923. The company makes forge shop equipment and sheet mill machinery.

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C. A. Collins, president Hanna Furnace Co., Buffalo, and vice-president of the M. A. Hanna Co., Cleveland, sailed recently on a Mediterranean cruise.

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Curtis M. Yohe, for several years in charge of purchases for the Pittsburgh & Lake Erie Railroad, has been appointed assistant to the president of the New York Central Lines, with headquarters in Pittsburgh. Mr. Yohe's appointment means that the Pittsburgh district will now have direct representation of the New York Central Lines.

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James E. Wallis, Jr., who formerly represented the Sullivan Machinery Co., Chicago, in Japan and later in Russia, has been made trade commissioner, at Berlin, Germany, for the Department of Commerce.

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Charles G. Burton, general manager of the National Sanitary Co., Salem, Ohio, has been elected president of that company, succeeding J. E. Finefrock, who has been made vice-president. Mr. Burton will continue as general manager.

The annual meeting of the American Refractories Institute will be held May 16 and 17 at White Sulphur Springs, W. Va.

OBITUARY

ANTHONY L. HERKENHOFF, general manager Minster Machine Co., Minster, Ohio, and for 30 years prominent in the machinery industry, died suddenly on Feb. 21 at Sidney, Ohio, while on a business mission. He was born at Minster in 1872 and attended the Minster public schools and later the St. Mary's Institute, Dayton, Ohio, now the Dayton University. After being employed by the Atlas Engine Co., Indianapolis, for a period of years, he was instrumental in the organization of the Minster Machine Co. in 1898, serving as its general manager from that time until his death. In 1916 he helped to organize the St. Marys Foundry Co., St. Marys, Ohio, and had served as vice-president and manager since its inception. In 1918 the Streine Tool & Mfg. Co., New Bremen, Ohio, was similarly organized, and he served as the president of that company since its organization.

A. L. HERKENHOFF

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WILLIAM CROUSE, vice-president Crouse & Pope Foundry Corporation, Auburn, N. Y., died at his home in that city on Feb. 25. He was born at Union Springs, N. Y., and was associated for a time with D. W. Osborne & Co., later the Auburn Works, International Harvester Co. He organized the Crouse & Pope corporation in 1919, with plant and offices at Weedsport, N. Y. The business was continued there until 1923, when the plant was destroyed by fire. The company was reorganized and plant built at Auburn.

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SAMUEL N. CRAIG, president of the Treadwell Construction Co. and the Midland Barge Co., Midland, Pa., was killed in an airplane accident at Aurora, Neb., Feb. 26. He was on his way to Los Angeles, and missing a train connection, he chartered the airplane to avoid loss of time. He was 42 years of age and was identified with the Riter-Conley Co. before organizing his own companies.

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O. M. STOW, treasurer of the Union Malleable Iron Co., Moline, Ill., before it was taken over by Deere & Co., and later treasurer of the Sechler Implement & Carriage Co., died Feb. 16 in Cleveland, where he had lived for the last 10 years.

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SIMON H. STUPAKOFF, president Stupakoff Laboratories, Inc., Pittsburgh, died at his home in that city Feb. 18. He was born in Germany 73 years ago, and was well known in the iron and steel industry as a maker of precision instruments, notably for heat and electrical recording.

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JAMES B. BAKER, president and general manager of the Safety Grinding Wheel & Machine Co., Springfield, Ohio, died suddenly on Feb. 26. He was 75 years of age.

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HENRY PHELPS HOWLAND, blast furnace superintendent for the Wisconsin Steel Co., South Chicago, Ill., died Feb. 23.

—

HERBERT L. HART, manager of the bolt and rivet department of the Inland Steel Co., Chicago, died Feb. 27. He was born in Chicago in 1866, and became affiliated with the Inland company in 1910.

Export Tonnage Highest for a Year

Imports of Iron and Steel Fall Off 9 Per Cent—Rails, Pipe, Tin Plate and Sheets Were Largest Finished Items Exported

WASHINGTON, Feb. 25.—Aggregating 205,766 gross tons, exports of iron and steel products from the United States in January were the highest for any month since January, 1927, when they totaled 215,235 tons. At the same time imports in January, amounting to 58,635 tons, were the lowest since last September's total of 58,464 tons. Exports in January exceeded by 37,338 those of December, 1927, while imports in January were 5553 tons less than those of December. For the seven months ended with January exports totaled 1,255,134 tons, a decrease of 106,393 tons from those for the corresponding period one year ago. Imports for the seven months ended with January, 1928, amounting to 425,170 tons, were 152,315 tons less than those for the corresponding period last year.

Gains made in exports in January when compared with December were reflected in a number of products, including scrap, ingots and semi-finished steel, steel bars, galvanized sheets, black steel sheets, hoops and bands, tin plate, steel rails, steel tubes and pipe and cast iron pipe. Losses were made in a number of items also, including plates, black iron sheets, structural material and iron castings. For the seven months ended with January, as against the corresponding period of one year ago, gains were made in scrap, increasing to 163,626 tons from 46,167 tons; pig iron, plain wire, barbed wire and woven wire fencing, wire nails, cast iron pipe, iron castings and forgings. Losses were made in a wide range of other products, such as semi-finished material, steel bars, galvanized sheets, black steel and black iron sheets, tin plate, structural steel, steel rails, steel pipe and tubes and car wheels and axles.

Decreases in imports in January when compared with February were made in pig iron, ferromanganese, structural shapes, steel bars, cast iron pipe and a number of other items, with no notable gains. By far the heaviest decline during the seven months ended with January, when compared with the corresponding period one year ago, was made in incoming shipments of pig iron, amounting to 83,376 tons and 136,768 tons respectively. The largest gain made was in imports of structural shapes, totaling 97,592 tons, against 84,641 tons.

Canada took 11,535 tons of the 29,376 tons of scrap exported in January, while Japan took 16,933 tons. Of the 8093 tons of steel bars exported during the month, Canada took 4703 tons and the United Kingdom 1310 tons. Canada was the destination of 7933 tons of the 8947 tons of plates exported. Japan led as the destination for black steel sheets, taking 10,844 tons of the 17,552 tons exported, while Canada took 3759 tons. Japan also was the principal consumer of tin plate exports in January, taking 8908 tons of the 19,668 tons exported;

Exports of Iron and Steel from the United States

(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Pig iron	4,403	3,734	32,856	19,826
Ferromanganese	1	55	1,349	468
Scrap	29,376	3,735	163,626	46,167
Pig iron, ferroalloys and scrap	*33,780*	*7,524*	*197,831*	*66,461*
Ingots, blooms, billets, sheet bar, skelp	5,674	3,212	64,952	74,993
Wire rods	3,970	2,319	11,486	12,223
Semi-finished steel	*9,644*	*5,531*	*76,438*	*87,216*
Steel bars	8,093	12,337	62,638	82,041
Alloy steel bars	521	490	3,641	2,861
Iron bars	395	432	1,743	3,455
Plates, iron and steel	10,009	10,470	79,289	80,476
Sheets, galvanized	11,097	19,474	77,504	109,767
Sheets, black steel	17,552	15,506	79,848	104,430
Sheets, black iron	1,036	1,570	9,306	9,935
Hoops, bands, strip steel	3,319	4,037	21,110	25,150
Tin plate; terne plate	19,668	41,874	121,033	194,310
Structural shapes, plain material	9,812	9,048	91,766	90,250
Structural material, fabricated	6,560	4,985	42,778	39,192
Steel rails	23,174	23,387	100,709	139,956
Rail fastenings, switches, frogs, etc.	9,370	3,164	27,112	24,762
Boiler tubes, welded pipe and fittings	21,787	42,300	132,414	199,773
Plain wire	3,786	2,271	23,362	14,140
Barbed wire and woven wire fencing	5,314	2,222	34,458	22,122
Wire cloth and screening	182	239	1,320	1,215
Wire rope	485	472	2,623	2,633
Wire nails	1,477	770	7,898	6,325
Other nails and tacks	736	647	5,190	3,772
Horseshoes	55	37	371	370
Bolts, nuts, rivets and washers, except track	867	1,002	7,332	7,151
Rolled and finished steel	*155,295*	*196,734*	*933,445*	*1,164,086*
Cast iron pipe and fittings	2,863	1,773	17,707	16,885
Car wheels and axles	932	1,115	7,988	9,227
Iron castings	1,065	770	6,993	5,130
Steel castings	707	421	3,523	3,327
Forgings	394	211	2,533	1,346
Castings and forgings	*5,961*	*4,290*	*38,744*	*35,915*
All other	1,086	1,156	8,676	7,849
Total	205,766	215,235	1,255,134	1,361,527

Imports of Iron and Steel into the United States

(In Gross Tons)

	January		Seven Months Ended January	
	1928	1927	1928	1927
Pig iron	11,127	9,326	83,376	136,768
Ferromanganese*	5,184	1,301	26,779	21,894
Ferrosilicon	405	957	2,495	8,790
Ferrochrome	31	359	84	552
Scrap	4,674	5,920	30,955	60,719
Pig iron, ferroalloys and scrap	*21,421*	*17,763*	*143,689*	*228,723*
Steel ingots, blooms, billets and slabs	1,319	944	8,475	12,721
Iron blooms, slabs, etc.	.....	.....	91	306
Wire rods	1,079	1,512	12,470	6,697
Semi-finished steel	*2,398*	*2,456*	*21,036*	*19,724*
Rails and splice bars	3,150	2,744	9,181	29,027
Structural shapes	11,080	11,363	97,592	84,641
Boiler and other plates	58	452	1,553	2,321
Sheets and saw plates	4,292	1,646	12,577	9,004
Steel bars	7,876	6,560	48,549	55,601
Bar iron	149	632	1,987	3,114
Hoops, bands and cotton ties	1,683	2,946	20,764	20,469
Tubular products (wrought)	2,046	5,146	19,690	24,694
Nails, tacks, staples	181	526	2,672	3,964
Tin plate	39	23	211	241
Bolts, nuts, rivets and washers	25	21	244	142
Round iron and steel wire	294	185	1,905	2,536
Barbed wire	350	459	1,531	1,367
Flat wire; strip steel	135	344	1,257	2,277
Steel telegraph and telephone wire	46	23	51	1,069
Wire rope and strand	94	117	909	1,423
Other wire	41	21	931	458
Wire cloth and screening	.....	48	.....	272
Rolled and finished steel	*31,539*	*33,256*	*221,604*	*242,620*
Cast iron pipe	2,778	9,534	36,997	64,606
Castings and forgings	499	443	1,844	1,812
Total	58,635	63,452	425,170	557,485
Manganese ore*	9,376	50,605	170,015	204,323
Iron ore	251,178	295,480	1,591,139	1,600,937
Magnesite (dead burned)	2,990	.....	29,235	20,459

*Manganese content only.

United States Imports of Iron and Steel Products During January, 1928

(In Gross Tons)

Belgium	15,322	Canada	4,997
Czechoslovakia	125	Panama	381
France	6,022	Mexico	29
Germany	10,211	Jamaica	628
Netherlands	1,720	British India	5,634
Norway	1,209	Hong Kong	2
Poland and Danzig	2,539	Japan	27
Sweden	1,228		
United Kingdom	8,561	Total	58,635

Canada took 2226 tons; Argentina, 1684 tons, and China, 1536 tons. Neither Canada nor Japan took any American rails in January. China was the greatest purchaser of this product, taking 8833 tons of the 23,174 tons exported. Brazil took 4213 tons; Guatemala, 2088 tons; Chile, 1477 tons; Argentina, 1356 tons.

Of the 11,127 tons of pig iron imported in January, British India supplied 5634 tons; the United Kingdom, 3750 tons, and the Netherlands, 1446 tons. Only 40 tons were received from Germany. The United Kingdom was the source of 2487 tons of the 5184 tons of ferromanganese imported during the month. Canada supplied 1459 tons and Norway 1204 tons. Belgium was the source of 5200 tons of the 7876 tons of steel bars imported in January; Germany, 1067 tons, and France, 1050 tons. Of the 11,080 tons of shapes imported during the month, 6758 tons came from Belgium; 2498 tons from Germany and 1567 tons from France. France also supplied 2443 tons of the 2498 tons of cast iron pipe imported during January.

Indiana and Michigan Wire Fence Manufacturers to Merge

Plans are being formulated for a merger of the Dwiggins Wire Fence Co., Anderson, Ind., and the Crawfordsville Wire & Nail Co., Crawfordsville, Ind., with the Adrian Fence Co., Adrian, Mich. The consolidated company will be known as the Mid-States Steel & Wire Co., with headquarters at Crawfordsville. Stockholders of the two Indiana companies have already approved the merger. J. E. Vandeventer, former secretary and treasurer of the Dwiggins company, will be chairman of the new company, and John Sommer, president of the Crawfordsville company, will be president. Consolidation will be effected through an exchange of stock, according to Floyd A. Deahl & Associates, Cleveland, who are handling the merger.

American Rolling Mill Co. Operating Sheet Mills Full

CINCINNATI, Feb. 28.—The American Rolling Mill Co. is operating all of its sheet mills at its various plants at 100 per cent of capacity and orders in hand are sufficient to carry through March. A number of contracts for second quarter have been made. Releases of tonnages on current contracts by automobile manufacturers have attained a substantial volume, while demand from other sources, notably from distributers, has been heavy. The company has just put into operation at its East Side works at Middletown, Ohio, a third long terne pot.

Carnegie Steel Co. Abandons Plan to Scrap Isabella Furnaces

The Carnegie Steel Co. has abandoned plans to dispose of the site of the Isabella furnaces, Etna, Pa., just outside the city limits of Pittsburgh on the Allegheny River, and the company soon will start the construction of a conveying system that will make it possible to serve these furnaces with river-shipped coke. These furnaces are located well back from the river and coke could be brought to them only by railroad, making the delivered cost high whether the coke came from the Connellsville district or by water from the Carnegie by-product coke plant at Clairton, Pa. Because coke could be brought to the Lucy furnaces, located in Pittsburgh on the Allegheny River, they have been operated and the Isabella furnaces, which are larger and more modern and also are outside the high taxes of the city of Pittsburgh, have been idle. A short time ago it was thought likely the Isabella furnaces would be dismantled and the site sold to the Baltimore & Ohio Railroad for extension of its freight terminal facilities. The Lucy and Isabella furnaces are used principally in the production of ferromanganese.

Destination of Iron and Steel Exports from the United States

(In Gross Tons)

	December, 1927	January, 1928	January, 1927
North and Central America and West Indies	*81,033*	*78,478*	*78,606*
Canada and Newfoundland	61,787	61,647	56,213
Cuba	5,006	3,892	6,918
Mexico	6,295	4,874	7,976
Guatemala	333	3,284	531
Salvador	3,452	217	425
Panama	1,186	448	1,022
British West Indies	629	541	1,717
Other West Indies	944	2,619	2,227
Other Central America	1,401	956	1,577
South America	*27,713*	*39,035*	*56,007*
Argentina	6,915	10,063	11,540
Brazil	3,492	9,018	13,168
Chile	4,917	5,810	1,935
Colombia	5,192	4,656	12,713
Peru	1,776	1,261	974
Venezuela	3,486	7,345	13,505
Other South America	1,935	882	2,172
Europe	*9,785*	*9,347*	*17,293*
France	173	237	459
Italy	1,763	848	1,039
Rumania	749	385	593
Turkey	77	21	560
United Kingdom	4,316	4,705	10,358
Other Europe	2,707	3,151	4,284
Far East	*47,127*	*77,861*	*61,045*
Australia	1,670	2,559	3,963
British Malaya	723	504	2,745
China	4,748	14,857	8,786
Dutch East Indies	1,912	2,190	6,744
India	1,792	1,191	4,363
Japan	27,054	47,320	26,651
Kwangtung	344	1,435	311
Philippine Islands	6,702	7,390	4,367
Other Asia and Far East	2,182	415	3,115
Africa	*2,770*	*1,045*	*2,332*
British South Africa	2,442	752	769
Egypt	86	66	398
Portuguese East Africa	61	46	881
Other Africa	181	181	284
Total	168,428	205,766	215,235

Standard Steel Car Co. Acquires Illinois Car & Mfg. Co.

The Standard Steel Car Co., Hammond, Ind., has taken over the Illinois Car & Mfg. Co., with plants at Hammond and Richmond, Ind., and Chicago Heights, Ill. Patrick H. Joyce, president of the Illinois company, will become one of the vice-presidents of the Standard Steel Car Co.

Suspend Proposed Rate Increases on Waster Plates and Sheets

WASHINGTON, Feb. 28.—The Interstate Commerce Commission has suspended until Oct. 1 tariffs which propose to increase the rates on waster plates or sheets, in carloads, between points in Central Freight Association territory. Illustrative of the schedules is the proposal to increase the rate from Middletown, Ohio, to Detroit from $3.65 to $5.94 per 100 lb.

Foundry Equipment Orders

Net orders for foundry equipment received by 18 members of the Foundry Equipment Manufacturers' Association in January amounted to 128.5 per cent of the average monthly shipments during 1922, 1923 and 1924. Shipments during the month were 116.4 per cent, and unfilled orders at the end of the month, 120.6 per cent. The three-month average of gross orders is given as 110.7 per cent.

Machinery Markets and News of the Works

FEBRUARY BUSINESS OFF

Machine Tool Orders in the Month Fall Below Those of January

Orders for the First Two Months, However, Ran Ahead of Bookings in Same Period Last Year

MACHINE tool sales in February did not equal those of January, some estimates being that the average decline in orders was about 10 to 15 per cent. Sales for the first two months of this year, however, exceeded those for the corresponding period in 1927. Demand for high-production tools kept up fairly well during the last month and some companies which specialize in that field report that their February sales did not suffer as compared with January, but most lines of standard tools were affected.

The large volume of outstanding quotations on recent inquiries gives promise of a fairly substantial business in March, but the situation is difficult to appraise because of the unevenness of industrial operations. Business in the Detroit automobile manufacturing district is not up to expectations.

The Apex Electric Mfg. Co., Cleveland, is inquiring for a number of tools for the manufacture of washing machines. The Ashtabula Bow Socket Co., Ashtabula, Ohio, has bought a few tools. The T. L. Smith Co., Milwaukee, is in the market for about $40,000 worth of shop equipment.

Several Western railroads are preparing to enter the market for their 1928 tool requirements. No action has been taken by the Atchison, Topeka & Santa Fe and the Delaware, Lackawanna & Western on pending lists.

New York

NEW YORK, Feb. 28.

THERE is a fair volume of machine tool purchasing and inquiries from industrial users continue to accumulate. The General Electric Co. has been making purchases of tools for its refrigerator and motor departments and still has a list of about 10 tools to close. The Wright Aeronautical Corporation has made further purchases and still has several machines to buy. Additional inquiries have been issued by the New York Central Railroad, but while this purchaser has a sizable total of machine tools under inquiry, it has not closed any business for some time. No action nas been taken as yet by the Delaware, Lackawanna & Western Railroad, which has a list of 30 tools under consideration.

Included in recent industrial purchases of machine tools were two Pratt & Whitney jig boring machines by an electric manufacturer, duplex hand centering machine by a gear maker in the Middle West, Pratt & Whitney No. 3 die sinker by a socket manufacturing company, 20 x 72-in. lathe by a Michigan company, 6-in. vertical shaper by an electric company in New Jersey, 12-in. vertical shaper by a tube company in Pennsylvania, Brown & Sharpe No. 2 G. automatic screw machine by a California company, Espen-Lucas No. 285 semi-automatic billet sawing machine by a Connecticut company.

Purchases of used tools have included an 18-in. Gleason bevel gear testing machine by a Connecticut machinery manufacturer, Wilson electric welding machine and Bement No. 2 horizontal cotter drill by a Pittsburgh company.

Bids are being asked by Knickerbocker Ice Co., 41 East Forty-second Street, New York, for a one-story addition to ice-manufacturing plant, 155 x 160 ft., at Flushing, L. I., to cost more than $70,000 with equipment. C. Leslie Weir is company architect, address noted.

American Zinc, Lead & Smelting Co., 331 Madison Avenue, New York, has plans for additions to plant at East St. Louis, Ill., to cost close to $500,000 with equipment. Lockwood, Greene & Co., 1 Pershing Square, New York, and Wilson Building, Charlotte, N. C., are architects and engineers.

Wood Newspaper Machinery Corporation, 501 Fifth Avenue, New York, manufacturer of printing presses, etc., with plant at Plainfield, N. J., has arranged for a stock issue of $717,500, portion of proceeds to be used for expansion in production, particularly for a new printing press unit.

Signal Corps Procurement District, Governors Island, N. Y., will receive bids until March 8, for motor alternators in lots of 25 to 200, circular 111; also for quantity of electrical instruments, circular 112; until March 13 for outpost wire in lots of 1200 to 2100 millimeters, circular 109.

Eleto Co., 153 East Twenty-fourth Street, New York, subsidiary of Lord & Taylor and James McCreery & Co., 5 West Thirty-fourth Street, department stores, operating for storage and distribution of both interests, has awarded general contract to White Construction Co., 95 Madison Avenue, for a ten-story, basement and sub-basement plant, including cold storage plant of 150,000 cu. ft. capacity; automobile service and repair department and garage on third floor, and divisions for manufacture of furniture. Distributing and sorting departments, first and second floor, will be equipped with belt conveyors, chutes and other mechanical handling equipment. Entire project will cost $2,500,000 with equipment.

Chupurdy Auto Coach Works, Inc., 444 West Forty-fifth Street, New York, manufacturer of automobile bodies, with repair division, has leased entire building 50 x 100 ft., at 213-15 West Sixty-fourth Street, for a new plant and will remove to new location. Additional equipment will be installed.

Department of Public Works, Division of Highways, Albany, N. Y., has plans for two two-story additions to repair and equipment maintenance shop at Poughkeepsie, N. Y., to cost approximately $75,000 with equipment. A. W. Brandt is commissioner.

Roberts-Boice Paper Co., Poughkeepsie, N. Y., will rebuild portion of the storage and distributing plant recently destroyed by fire, with loss estimated at $150,000 including equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 6 for 42 galvanized steel towers for Brooklyn Navy Yard, schedule 8528; also for 5 motor generators, control panels and spares, schedule 8525, and for spare parts for turbo-generator sets, schedule 8585.

Bayonne Steel Ceiling Co., 223 West Nineteenth Street, New York, will soon take bids on revised plans for a two-story plant at Long Island City, to cost about $75,000 with equipment. William Higginson, 101 Park Avenue, is architect and engineer.

New Rochelle Water Co., 514 Main Street, New Rochelle, N. Y., will take bids for a two-story equipment repair, service and distributing building, with automobile service and garage, 45 x 120 ft., to cost more than $80,000 with equipment. H. B. Peare, 11 North Avenue, is architect.

H. J. Nurick, 44 Court Street, Brooklyn, architect, has plans for a new automobile service, repair and garage

building, 75 x 235 ft., to cost close to $100,000 with equipment.

Board of Education, Rensselaer, N. Y., is considering installation of manual training equipment in its two-story junior high and grade school, to cost about $200,000. C. H. Gardinier, 75 State Street, Albany, N. Y., is architect.

Borough Council, Spring Lake, N. J., is considering installation of a municipal electric light and power plant, and will soon secure estimates of cost.

Rubberstone Corporation, 1 Madison Avenue, New York, manufacturer of flooring, etc., has acquired property, 100 x 300 ft., at Hillside, N. J., improved with a one-story factory, for a new plant.

Consolidated Safety Pin Co., 46 Farrand Street, Bloomfield, N. J., will proceed with superstructure for a three-story addition, 34 x 75 ft., for which general contract has been let to John B. Roberts, 949 Broadway, New York, to cost upward of $70,000 with equipment.

Transogram Co., 148 Thirty-ninth Street, Brooklyn, manufacturer of toys, games, etc., has plans for a one-story plant, 90 x 400 ft. at Haskell, N. J., to cost about $50,000 with equipment, and will remove to new location. Additional machinery will be installed. Oscar Goldschlag, Inc., 1482 Broadway, New York, is architect and engineer.

Ovens, power equipment and other machinery will be installed in the three-story plant to be erected by Forester Bakery, Inc., Bergenfield, N. J., to cost $100,000 with equipment. McCormick Co., 41 Park Row, New York, is architect and engineer.

Armstrong Cork Co., Codwise Avenue, New Brunswick, N. J., has awarded general contract to George B. Rule, Inc., 71 John Street, for rebuilding of portion of local finishing mill and distributing building, recently destroyed by fire, to be one story, 115 x 175 ft., to cost more than $60,000 with equipment. Henry Boettcher, Lancaster, Pa., is architect. Company headquarters are at last noted place.

Colony Paper Box & Novelty Co., Jersey City, N. J., has leased with option to purchase the three-story factory at Guttenberg, N. J., including one-story factory adjoining, for a new plant for manufacture of paper boxes, corrugated containers, etc.

Board of Education, City Hall, Newark, will install a manuel training department in an addition to West Side high school to cost $200,000, for which superstructure will be placed under way at once.

Airport Construction Corporation, 21 East Fortieth Street, New York, has been organized to construct airports, airplane hangars, mooring towers and kindred structures. Clarence D. Chamberlin, transAtlantic flyer, will be associated with company in consulting capacity.

Excelsior Plimptruck Co., Stamford, Conn., has been organized to manufacture trucks formerly made by Plimpton Lift Truck Corporation. Operations have not yet begun.

Central Metering Corporation, Grand Central Terminal, New York, has been organized to engage in sub-metering, and will be in market for new and used meters.

Hamilton-Diuguid, Inc., 1111-13 Bedford Avenue, Brooklyn, has been organized to succeed H. A. Diuguid Co. and will do motor rebuilding and general machine work.

Standard Sales & Mfg. Corporation, 103 Park Avenue, New York, has been organized to manufacture steel mail boxes for apartment and office buildings. It will also make stamped steel milk bottle receivers, fire place dampers, ashpit dumps, clean out doors and medicine cabinets. Products are at present being manufactured under contract, but company expects to have its own plant equipped in May and will then be in market for raw materials.

Leeds, Tozzer & Co., 75 West Street, New York, has been appointed special representative for Eastern railroads for Universal Crane Co., Cleveland. Recent statement in these columns that the New York company would represent Universal organization on all products is incorrect, as remainder of trade will continue to be handled by company's other office in New York.

St. Louis

ST. LOUIS, Feb. 27.

PLANS are being considered by Pagne Mfg. Co., Twenty-ninth Street and Southwest Boulevard, Kansas City, Mo., manufacturer of tin cans and other containers, for a one-story factory to cost about $35,000 with equipment.

Gill & Jackson, Buder Building, St. Louis, architects, have asked bids on a six-story automobile service, repair and garage building, 102 x 145 ft., to cost $350,000 with equipment.

Oklahoma Natural Gas Corporation, Oklahoma City, Okla., is disposing of a preferred stock issue to total $7,500,000, portion of fund to be used for expansion, including pipe line construction. Company recently sold a bond issue of $14,000,000 for similar work.

C. L. Monnot, Magnolia Building, Oklahoma City, Okla., architect, has superstructure in progress for a two-story automobile service, repair and garage building, 140 x 160 ft., to cost close to $100,000 with equipment.

City Council, Trenton, Mo., has engaged Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., engineer, to prepare plans for a municipal electric light and power plant, to cost in excess of $60,000 with equipment.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., is said to have plans for four new power houses at Healdton, Lexington, Meeker and near Wynnewood, Okla., to cost upward of $200,000 with equipment. Stations will be used in connection with pipe line project of Shell Pipe Line Co., now in progress.

Joslyn Mfg. & Supply Co., North Kansas City, Mo., manufacturer of tubes, knobs and other equipment, has filed plans for a one-story factory, 55 x 165 ft., to cost $35,000. It will replace plant recently destroyed by fire. Headquarters are at 133 West Washington Street, Chicago.

City Council, Hannibal, Mo., is planning extensions and improvements in municipal electric light and power plant, to cost approximately $150,000 with equipment. Arnold Engineering Co., 565 West Washington Street, Chicago, is engineer.

Board of Education, Kearney, Neb., has plans for a one-story addition to manual training school, to cost about $40,000 with equipment. H. M. McClure, Kearney, is architect.

Western Ice & Cold Storage Co., Shawnee, Okla., operating Shawnee Ice Co., is planning extensions and improvements in ice-manufacturing and cold storage plant to double present capacity, to cost upward of $50,000.

L. J. Kent Boiler & Sheet Iron Works, 700 East Brower Street, Springfield, Mo., is planning installation of a milling machine, shaper and other tools in connection with a one-story addition to cost approximately $40,000.

Roxanna Petroleum Co., Mayo Building, Tulsa, Okla., has plans for a new gasoline refinery near Marshall, Okla., with initial capacity of about 60,000 gal. per day, to cost close to $100,000 with equipment.

R. H. Sanneman, Lee Building, Kansas City, Mo., architect, will soon begin superstructure for a one-story automobile service, repair and garage building, 170 x 240 ft., to cost approximately $150,000 with equipment.

East Arkansas Compress Co., Forrest City, Ark., A. G. Davidson, head, is contemplating a one-story cotton compressing plant, to cost about $85,000 with equipment.

Cutter Machine Co., 3723 Commonwealth Avenue, St. Louis, has taken over manufacture of grinding and polishing machinery formerly conducted by St. Louis Machine Tool Co., latter company having ceased manufacturing activities.

Union Pacific Railroad Co., Omaha, Neb., is reported planning a rock quarry for development of limestone property near Granite Canyon, Wyo., to cost about $150,000 with machinery.

Cleveland

CLEVELAND, Feb. 27.

MACHINE tool sales continue rather moderate although a little improvement was reported the past week. Orders are coming from scattered sources and consist mostly of single machines. The Apex Electric Mfg. Co., of Cleveland, is planning expansion of its manufacturing facilities for making washing machines and is inquiring for a number of tools, including drilling machines. The Ashtabula Bow Socket Co., Ashtabula, Ohio, purchased several tools the past week; Steel & Tubes, Inc., Cleveland, bought a 96-in. shear for its Elyria plant and the Central Alloy Steel Corporation, Massillon, purchased a vertical shaper for its Berger plant. Makers of turret lathes report a gain in single tool orders.

Plans are being considered by Massillon Steel Casting Co., Massillon, Ohio, for a one-story foundry to cost close to $35,000 with equipment.

Police Fire Alarm Mfg. Co., Akron, Ohio, care of Philip E. Hart, 418 Merriman Road, recently formed by Mr. Hart and associates, is arranging for early contruction of a one-story plant, to cost about $25,000 with equipment.

General Tire & Rubber Co., Akron, has acquired property at Kansas City, Mo., and plans construction of new three-story factory branch and distributing plant to cost approximately $175,000 with equipment.

Board of Education, Fairview Village, Ohio, plans installation of manual training equipment in a two-story senior and junior high eschool to cost $230,000, for which bids

will be taken at once on general contract. Fulton & Taylor, 8120 Euclid Avenue, Cleveland, are architects.

National Milling Co., Front Street, Toledo, Ohio, has awarded general contract to Gettins-Kopitke Co., Wabash Avenue and Fifteenth Street, for a new flour mill unit, with packing and distributing facilities, to cost approximately $500,000 with machinery.

Mullins Body Co., Salem, Ohio, manufacturer of automobile bodies, is considering a one-story addition, 50 x 290 ft., to cost about $75,000 with machinery.

Oil Products Co., East Toledo, Ohio, is planning to rebuild portion of plant destroyed by fire Feb. 13, with loss more than $50,000 including equipment.

City Council, Akron, has approved a bond issue of $900,000 for purchase of 600 acres of land in southeastern part of city and establishment of municipal airport, with hangars, shops and other structures. Negotiations are in progress with Goodyear Tire & Rubber Co., for construction of its plant for production of Goodyear-Zeppelin dirigibles on portion of tract. Latter project is estimated to cost upward of $1,500,000.

New England

BOSTON, Feb. 27.

FEBRUARY closes with mixed reports from machine tool dealers. Those who did little business in January report a marked increase in this month's sales, while a majority of dealers just about broke even in both months. The net result represents a fair gain for the trade, as a whole, in February. Machine tool builders generally will do better than in January, but business is quite spotty. Some Connecticut tool manufacturers are getting good export as well as domestic business. Local machinery trade again fell off the past week, particularly in the used tool field. The most important sales included two thread millers to a Rhode Island shop, a 20 ft. x 48-in. lathe to a Worcester plant, three tool room lathes to as many Boston plants, a used pipe machine to a greater Boston shop, a used steam hammer to a Rhode Island firm, and a 14-in. used lathe and milling machine to a Vermont company.

The city of Boston has not yet awarded the tools required for a continuation school. Bids closed Feb. 23 for miscellaneous wood-working tools for another Boston school, and will close March 1 on miscellaneous millwright equipment for still another school. Bids close tomorrow on lathes and grinding machines for the Government at Newport, R. I.

Small tools continue in fair demand, but February sales will fall short of those in January.

Stanley S. Porter, 462 Main Street, Melrose, Mass., has started work on a one-story automobile repair shop. Plans are private.

New England Metal Culvert Co., Palmer, Mass., has purchased 19,238 ft. of land with railroad siding, and has let contract for a plant at 10 Alger Street, Boston. It will be ready to operate May 1.

J. Trainor, architect, has plans in progress for a two-story, 40 x 280 ft. molding compounds plant unit for General Electric Co., Pittsfield, Mass. C. C. Chesney is general manager.

Walworth Co., Boston, pipe fittings, etc., has leased space in Statler office building, Park Square district.

Donlan Foundry Co. has taken over plant and business of G. E. Hoglund Foundry Co., Gardner, Mass.

Northern Connecticut Light & Power Co., Thompsonville, Conn., has engaged J. G. White Engineering Corporation, 43 Exchange Place, New York, engineer, to prepare plans for a hydroelectric generating plant on Connecticut River, near Windsor Locks. It will have initial capacity of 50,000 hp., and will cost more than $1,500,000 with transmission lines.

Chickering & Sons, 791 Tremont Street, Boston, manufacturers of pianos, piano mechanisms, etc., are arranging for early removal of their local factory to a new plant now in course of construction at Roxbury Crossing, to cost more than $100,000.

E. Ingraham Co., North Main Street, Bristol, manufacturer of clocks, clock movements, etc., has awarded general contract to Charles Smith & Sons, Derby, Conn., for a one-story addition to its press department, 25 x 160 ft., to cost about $40,000.

New England Water, Light & Power Co., Providence, R. I., is being organized by Arthur B. Lisle, Providence, formerly vice-president and general manager Narragansett Electric Lighting Co., and associates, with capital of $4,000,000, to take over and operate electric light and power companies in New England, to include power plant development and transmission line construction.

Jewell Belting Co., Hartford, Conn., manufacturer of mechanical belting, has arranged for sale of its local plant and machinery and will discontinue operations here.

Robert Gair Co., Montville, Conn., manufacturer of corrugated boxes and containers, has plans for a power house to cost about $45,000 with equipment. Headquarters are at 420 Lexington Avenue, New York.

Locke-Stevens Corporation, 94 Warrenton Street, Boston, manufacturer of plumbing equipment and supplies, has filed plans for extensions and improvements to cost close to $20,000.

New England Public Service Co., Augusta, Me., operating Central Maine Power Co., Public Service Co. of New Hampshire and other light and power utilities, is disposing of a preferred stock issue of $2,425,000, a portion of proceeds to be used for expansion, including acquisition of additional properties, and extensions in generating and transmission line facilities. Walter S. Wyman is president.

Arrow Knitting Needle Co., Manchester, N. H., is carrying out an expansion program, including installation of additional equipment.

Gulf States

BIRMINGHAM, Feb. 27.

PLANS are being completed by Central Power & Light Co., San Antonio, Tex., for an addition to its power house at Victoria, Tex., including installation of 6000 kw. turbo-generator and auxiliary equipment. An extension will also be built to local ice-manufacturing plant, with machinery to increase capacity to 120 tons per day.

Chamber of Commerce, Slattery Building, Shreveport, La., H. F. Porter, secretary, has plans for a one-story machine shop in connection with a hangar to be built at Steere aviation field.

Birmingham Electric Co., Birmingham, is disposing of a bond issue of $9,200,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction.

Hidalgo Utilities Co., Hidalgo, Tex., is planning a new one-story ice-manufacturing plant, to cost approximately $50,000 with equipment.

Mason Foundry Co., Laurel, Miss., has approved plans for a one-story machine shop and foundry addition, to cost close to $40,000 with equipment.

St. Louis & Southwestern Railway Co., Tyler, Tex., is said to be planning extensions and improvements in car and locomotive shops, to cost $95,000 with equipment. W. S. Hanley is chief engineer.

In connection with an appropriation of about $4,500,000 for line extensions and improvements in 1928, Missouri-Kansas-Texas Railroad Co., Dallas, Tex., will expend $227,393 for new shop machinery and tools for repair works in Texas area.

E-Z Opener Bag Co., Decatur, Ill., has plans for a new paper mill and bag manufacturing plant at Tuscaloosa Ala., including power house, machine shop and other units, entire project to cost more than $4,000,000 with machinery.

Dry-Kold Products Co., Dallas, Tex., is planning early construction of a one-story plant for production of dry ice, a special compressed carbonic gas, to cost $40,000 with equipment.

Texas Utilities Co., Mineral Wells, Tex., operated by Community Power & Light Co., is planning construction of one-story ice-manufacturing plant, to cost close to $80,000 with machinery.

Moody-Seagreaves Corporation, Esperson Building, Houston, Tex., operating pipe lines for oil transmission, is said to be planning a new line for natural gas from Richland Parish field to a point near St. Louis, to cost more than $12,000,000 with compressor stations, etc.

Atchison, Topeka & Santa Fe Railway Co., Amarillo, Tex., has asked bids for a one-story machine repair shop, 200 x 500 ft., at its local works, to cost in excess of $100,000 with equipment. M. C. Blanchard is chief engineer of Western lines.

Phillips Petroleum Co., Bartlesville, Okla., is reported planning construction of carbon black plants in Carson and Hutchinson Counties, Tex., to include machine shops, pipe lines, tramway system and other mechanical equipment, to cost about $175,000 each.

Alabama Power Co., Birmingham, is said to be arranging for early construction of a steel water tower at Florence, Ala., 150,000 gal. capacity, to cost about $40,000.

Tropical Furniture Co., Miami, Fla., has been formed by officials of General Industrial Corporation, Miami, to

take over and operate factory of Roman Mfg. Co., N. W. Seventh and Thirteenth Streets, manufacturer of furniture. Purchasing company will remodel plant and install additional machinery. C. W. Heller is president of General Industrial organization.

Cotton Concentration Co., Twelfth and A Streets, Galveston, Tex., is contemplating an addition to its plant on Broadway for cotton compressing, to cost about $75,000 with machinery.

Eternit, Inc., Fifteenth and Locust Streets, Philadelphia, manufacturer of asbestos shingles, etc., has leased property at Houston, Tex., for a new factory branch and distributing plant, to cost more than $50,000.

Western Public Service Co., Alvin, Tex., is planning early purchase of an electrically-operated pumping unit, 500 gal. per min., in connection with extensions and betterments in waterworks. A quantity of cast iron pipe will be purchased. Carlton Ely is local superintendent.

City Council, Monroe, La., is asking bids until March 14 for two 4200-gal. per min., one 3100-gal. per min. and one 10,000-gal. per min. centrifugal pumping units, with accessories, for municipal waterworks, including eight-panel switchboard, motors for pumps and auxiliary equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Southern Ice & Utilities Co., Santa Fe Building, Dallas, Tex., has plans for a one-story ice-manufacturing plant at Big Spring, Tex., for initial capacity of 100 tons per day.

Philadelphia

PHILADELPHIA, Feb. 27.

FOLLOWING recent purchase of shipyard of William Cramp & Sons Ship & Engine Building Co., Philadelphia, by Francis J. McDonald, head of Philadelphia Ship Repair Co., a new organization, Kensington Shipyard & Dry Dock Co., has been formed to take over and operate plant. Plans are under way for expansion and improvements to cost about $500,000. Mr. McDonald is president of new company; Francis J. McDonald, Jr., secretary, and John E. Worthington, treasurer.

Nice Ball Bearing Co., Thirtieth Street and Nicetown Avenue, Philadelphia, will soon take bids for an addition, to cost more than $40,000 with equipment.

Norton Co., Worcester, Mass., has awarded general contract to Harry McGill, Jr., Philadelphia, for a two-story and basement factory branch and distributing plant, 57 x 100 ft., at Philadelphia, to cost about $50,000. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Charles Kahn, Morris Building, Philadelphia, has acquired property, 119 x 151 ft., at Fifty-seventh and Walnut Streets, and plans construction of a multi-story automobile service, repair and garage building, to cost in excess of $100,000 with equipment.

Pennsylvania Railroad Co., Philadelphia, plans expansion in its car and locomotive repair shops at Todd's Cut, Wilmington, Del., to provide for work on district lines heretofore carried out at West Philadelphia shops, centralizing operations at Wilmington; a new main shop unit is proposed, reported to cost more than $75,000 with equipment. Plans have been completed for an electrical repair shop at Todd's Cut plant, in connection with electrification of Philadelphia-Wilmington lines, now under way.

E. I. duPont deNemours & Co., duPont Building, Wilmington, Del., is arranging for immediate erection of a new plant at Gibbstown, N. J., for production of ammonia under a new process, to cost more than $400,000 with equipment.

Board of Education, Camden, N. J., plans installation of manual training equipment in a high school to be erected at East Camden, to cost in excess of $400,000 with equipment.

Board of Trustees, Drexel Institute, Thirty-second and Chestnut Streets, Philadelphia, will soon take bids on general contract for a new mechanical engineering building, 192 x 470 ft., to cost in excess of $500,000. Simon & Simon, 249 South Juniper Street, are architects.

duPont Powder Co., duPont Building, Wilmington, Del., is arranging an expansion and improvement program at its Barksdale, Wis., plant for increased production of nitric acid, to cost $400,000 with equipment.

Milton Canning Co., Milton, Del., will rebuild portion of plant destroyed by fire Feb. 18, with loss reported in excess of $200,000, including machinery.

Ovens, power equipment, conveying and other machinery will be installed in one and two-story plant to be erected by Heimbach Baking Co., Allentown, Pa., to cost $225,000. Jacoby & Evertt, Commonwealth Building, are architects.

Fire, Feb. 23, destroyed a portion of building at Second and Erie Streets, Camden, N. J., occupied by Philadelphia Metal Stamping Co., Allied Metal Stamping Co., William McIntosh Metal Stamping Co., and James A. MacMillan Chemical Co., with total loss, divided among companies noted, estimated at $200,000.

South Chester Tube Works, Inc., Front and Thurlow Streets, Chester, Pa., manufacturer of steel tubing, pipes, etc., is planning a one-story addition, to cost in excess of $45,000 with equipment.

Board of Freeholders, Camden, N. J., has work in progress on a new County vocational school, to cost $950,000 with equipment.

Bethlehem Steel Co., Bethlehem, Pa., has authorized an expansion and improvement program at its limestone quarries at Naginey, Pa., including installation of electrically-operated crushing machinery, breakers, screens, cranes, cars and other equipment. Entire project will cost about $200,000.

Shirley B. Watts, Harrisburg, Pa., has acquired automobile service, repair and garage building on Herr Street and plans enlargements with installation of additional equipment to cost approximately $100,000. Mr. Watts was formerly local manager for Bell Telephone Co. and will operate garage property as a new enterprise.

National Metal Edge Box Co., Callowhill at Thirteenth Street, Philadelphia, manufacturer of paper box machinery, paper box corner stays and kindred products, has moved into a new and larger factory and expanded scope of consulting engineering department.

South Atlantic States

BALTIMORE, Feb. 27.

PERMISSION has been asked by Suburban Light & Power Co., Munsey Building, Baltimore, for installation of transmission lines, power stations, etc., in St. Mary's, Calvert, Charles and Prince George Counties; also authority to issue preferred stock in amount of $775,000, to be used in part for project. Company was organized recently by George W. Woolford, president of Eastern Shore Trust Co., and associates, who will be president. Ezra B. Whitman, 18 East Lexington Street, will be engineer in charge of construction.

Rogers Air Lines, Inc., Baltimore, care of Gerald A. Lee, 16 West Saratoga Street, has negotiations under way for site at proposed municipal airport for new plant to manufacture commercial airplanes, including seaplanes. Initial works are reported to cost close to $40,000, and will be used largely for assembling.

Chief of Engineers, Washington, is asking bids until March 27 for one 200-kw. Diesel engine-generating set, complete with auxiliaries, and one station switchboard complete, with spare parts, circular 15.

American Tobacco Co., Reidsville, N. C., is reported planning construction of new plant, including department for redrying and conditioning, and steam power plant, to cost close to $800,000 with equipment. Headquarters are at 111 Fifth Avenue, New York.

National Public Service Corporation, operating Eastern Shore Public Service Co., Salisbury, Md., and other utilities, affiliated with Middle West Utilities Co., 72 West Adams Street, Chicago, is disposing of bond issue of $20,000,000, a portion of proceeds to be used for extensions and improvements, including transmission line construction. Harry Reid is president.

Industrial Fibre Co., West Ninety-eighth Street and Walford Avenue, Cleveland, is said to have engaged J. E. Sirrine & Co., Greenville, S. C., architects and engineers, to prepare plans for a rayon mill, with power plant, machine shop and other mechanical buildings, on site in that vicinity, to cost $750,000 with machinery.

Blue Ridge Talc Co., Henry, Va., is rebuilding portion of its plant recently destroyed by fire, with new one-story unit, 45 x 107 ft. Installation will include pulverizing equipment, blenders, elevators, hoppers, bins, scales, etc., to cost about $65,000.

Bureau of Supplies and Accounts, Navy Department, Washington, is asking bids until March 13 for electric portable drills and grinders for Eastern and Western yards, schedule 8549; until March 6 for centrifugal pumping unit, capacity 400 gal. per min., for Mare Island yard, schedule 8567; until March 13 for band saws and spare parts, Eastern and Western yards, schedule 8552; until March 6 for three motor-generator sets and spare parts for Washington yard, schedule 8511.

Hooker-Bassett Furniture Co., Martinsville, Va., is considering new plant unit to double present capacity. Arrangements are being made for sale of stock totaling $300,000, considerable portion of fund to be used for expansion.

Board of Education, Charlotte, N. C., is considering installation of manual training equipment in addition to Alexander Graham Junior High School, to cost $150,000, for which plans will soon be drawn.

The Crane Market

THERE is a moderate volume of inquiry, but prospective purchasers are slow to close business. In addition to a number of inquiries for overhead cranes that have been pending for several weeks, Fox Brothers International Corporation, New York, is asking for bids on two lists of cranes for export. These include a 25-ton, 55-ft. span, 5-ton, 25-ft. span and two 3-ton, 25-ft. span, 40 and 50-ft. lift, overhead cranes for the Turkish Government and a list of eight cranes for the Colombian Government, a 25-ton, 20-ton, 15-ton and 10-ton, 65-ft. spans, a 3-ton, 15-ft. span, 8-ton, 35-ft. span and two 2-ton, 18-ft. span overhead cranes. Thomas E. Murray, consulting engineer, 55 Duane Street, New York, is inquiring for a 100-ton overhead crane for the New York Edison Co. In the field of locomotive cranes, the Frederick Snare Corporation, New York, which has a large breakwater contract at Lima, Peru, is reported taking bids on a 25-ton locomotive crane.

Among recent purchases are:

Phoenix Utility Co., 71 Broadway, New York, 150-ton power plant crane from Cleveland Crane & Engineering Co.

Standard Oil Co. of New Jersey, 20-ton, 50-ft. span hand power crane from Box Crane & Hoist Corporation.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., two used 10-ton, 34-ft. span, 3-motor Niles overhead cranes from Niles Crane Corporation.

New York Central Railroad, New York, used 25-ton locomotive crane from the Conowingo project, through unnamed seller.

F. L. Smidth & Co., New York, a 10-ton, 74-ft. span bucket crane for Monolith-Portland Cement Co., Los Angeles, Cal., from Western builder.

George J. Atwell Co., 1 Park Avenue, New York, 7½-ton truck crane from Browning Crane Co.

Carnegie Steel Co., Pittsburgh, 25-ton, 70-ft. 6-in. span overhead crane with 10-ton auxiliary for its Duquesne works from Alliance Machine Co.

Stone & Webster, Inc., 49 Federal Street, Boston, engineer, will be in charge of installation of steam-operated electric power plant of Potomac Electric Power Co., Washington, at Bennings. Project will cost close to $2,000,000 instead of smaller amount recently noted.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until March 21, for a hangar and mechanical shop, 203 x 228 ft., at Hampton Roads, Va., specification 5568.

Automotive Corporation of America, Inc., North Fallsway, Baltimore, V. P. Williams, vice-president, has concluded arrangements for purchase of plant and business of George W. Davis Motor Car Co., Richmond, Ind., and will continue production of automobiles with special devices and equipment. Company proposes to use either this plant or to build a factory for special automobile manufacture.

Globe Iron & Metal Co., 1620 Gough Street, Baltimore, has been incorporated by sons of its late president, Moses Schein, and will continue to deal in ferrous and nonferrous old materials.

Pittsburgh

PITTSBURGH, Feb. 27.

MACHINE tool business is making a favorable showing in comparison with this time last year, losses reported by some dealers being offset by gains in others. Sales of more than single tools are unusual. There is some disappointment that purchases against the quarterly list of the Westinghouse Electric & Mfg. Co. have been fewer than expected.

Bids will be asked by United States Engineer, Keenan Building, Pittsburgh, for a power plant at Lock 6, Allegheny River, Kelly Station, near Clinton, Pa.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has approved plans for extensions and improvements at its sheet glass mill at Ford City, Pa., to cost upward of $400,000, including installation of continuous grinding and polishing system and other equipment. Company is said to be contemplating construction of a new Pacific Coast plant, vicinity of Richmond, Cal., to cost close to $5,000,000 with machinery.

Hubbard & Co., Granite Building, Pittsburgh, manufacturers of heavy hardware, have plans for a one-story addition, 150 x 225 ft., to be used primarily for assembling. A portion will be reserved for storage and distributing service. It will cost more than $100,000 with equipment.

Evans-Wallower Lead Co., Charleston, W. Va., has been formed with a capital of $1,250,000 and 500,000 shares of common stock, no par value, to take over and consolidate Evans Lead Co., Charleston, and Golden Rod Mining & Smelting Co., operating lead properties at Joplin, Mo. New company has plans for expansion. Edgar Z. Wallower, heretofore president of Golden Rod company, will head new organization; Ray M. Evans will be first vice-president.

Carson Battery & Brake Co., 1331 Third Avenue, Huntington, W. Va., has awarded general contract to R. Mankin & Co., Huntington, for a one-story works, 50 x 160 ft., to replace a structure recently destroyed by fire.

Following recent purchase of plant and business of United States Three-Way Dump & Hoist Co., Pittsburgh, manufacturer of motor truck bodies and hoists, etc., by Commercial Shearing & Stamping Co., Youngstown, Ohio, last noted company has arranged for concentration of production at Youngstown plant, where expansion will be carried out, including division body and hoist manufacture.

Fokker Aircraft Corporation of America, Glendale, W. Va., will proceed with superstructure for a local plant for assembling and other service, to cost in excess of $100,000 with equipment. Contract for building has been let to R. R. Kitchen Co., Wheeling W. Va.

Chicago

CHICAGO, Feb. 27.

SALES of machine tools this month are well ahead of the corresponding period in 1927, but not quite so large as in January of this year. Both inquiry and orders are widely scattered and usually specify one or two tools. Bids against the Santa Fe list are being submitted, but the trade looks for no action for at least four weeks. A double dry grinder has been added to its list. The T. L. Smith Co., Milwaukee, is in the market for $40,000 worth of tools. Several Western railroads are preparing lists and three junior high schools are under construction in Chicago. Deere & Co., Moline, Ill., have closed for a number of used machines, and a can company in Chicago has purchased a 24-in. shaper.

Roth Brothers & Co., 1400 West Adams Street, Chicago, manufacturers of electrical machines, have purchased property in Cicero, Ill., for erection of factory buildings.

Plans are being considered by Ahlberg Bearing Co., 321 East Twenty-ninth Street, Chicago, manufacturer of ball bearings, for a one-story addition, to cost close to $40,000 with equipment.

Board of Education, Park Ridge, Ill., plans installation of manual training equipment in a new three-story high school to cost $475,000, for which bids will be asked on general contract early in April. Zack & McCaughey, 222 West Adams Street, Chicago, are architects.

Reflector & Hardware Specialty Mfg. Co., 2235 South Western Avenue, Chicago, will begin foundations for new two-story and basement plant, 92 x 135 ft., to cost $70,000, for which general contract has been let to Christopher Rasmussen, 77 West Washington Street.

City Council, Detroit Lakes, Minn., is asking bids until March 5 for a complete steam engine generating unit for municipal electric power plant, with alternate proposals on units of 500 kva. and 625 kva., respectively; also for a one-ton electrically operated ash hoist. L. P. Wolff, St. Paul, Minn., is consulting engineer.

Northern States Power Co., 15 South Fifth Street, Minneapolis, Minn., is negotiating for purchase of municipal light and power plant at Lakefield, Minn., and proposes extensions and improvements, with transmission line construction, to cost about $100,000.

Rath Packing Co., Waterloo, Iowa, has authorized plans for a steam power house at its plant to cost $30,000. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects.

Chicago Motor Ramp, Inc., 38 South Dearborn Street, Chicago, has awarded general contract to B. W. Construction Co., 720 Cass Street, for a ten-story automobile service, repair and garage building, to cost about $750,000 with equipment. George C. Nimmons, 122 South Michigan Avenue, is architect.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, is reported planning a new steel frame coaling station at Streator, Ill., to cost about $70,000 with equipment.

City Council, Audubon, Iowa, is planning installation of a water purification plant for municipal water system, to cost about $40,000. Bonds will be voted March 28.

Otter Tail Power Co., Fergus Falls, Minn., will make extensions and improvements in steam-operated electric power plant at Langdon, N. D., including installation of new equipment.

Minerallas Electric Co., 1045 Washington Boulevard, Chicago, manufacturer of electrical equipment, has filed plans for a new two-story plant, 75 x 115 ft., to cost approximately $40,000 with equipment.

L. H. Marston, 432 Lincoln Highway, DeKalb, Ill., architect and engineer, has plans for a new one-story factory for manufacture of metal doors, sash, etc., company name temporarily withheld, to cost more than $100,000 with equipment.

Allied Industrial Products Co., 120 North May Street, Chicago, manufacturer of grinding wheels, buffing equipment, etc., will soon take bids on general contract for a new three-story and basement plant, 40 x 105 ft., to cost $80,000 with equipment. Meyer & Cook, 820 Tower Court, are architects.

Cudahy Packing Co., Newport, Minn., meat packer, has plans for a five-story and basement cold storage and refrigerating plant, 114 x 132 ft., to cost in excess of $100,000 with equipment.

Excelsior Stove & Mfg. Co., Quincy, Ill., has begun construction on its six-story warehouse, 70 x 170 ft.. A foundry, 110 x 235 ft., will be erected adjacent to the new unit and a cupola room, 70 x 150 ft. Buildings will replace portion of plant destroyed by fire several months ago.

Traction Truc-tor Co., Des Moines, Iowa, has been organized to manufacture gas-electric four-wheel-drive Tructors, designed for buses, trucks or tractors and embodying features of portable universal power plant. Company is preparing for production and will purchase electric generators and motors, steering gears, springs, radiators and other accessories. General construction and assembly will be carried on in plant of Baker Machinery Co., Des Moines.

Goetz Brass Co., 630 North Franklin Street, Chicago, manufacturer of bath, shower and lavatory fixtures and special brass products, has changed its corporate name to H. E. Robertson Co.

Detroit

DETROIT, Feb. 27.

EXTENSIONS and improvements in power house are being planned by Board of Trustees, University of Michigan, Ann Arbor, to cost $100,000 with equipment. An appropriation is being arranged.

Frost Gear & Forge Co., Horton Street, Jackson, Mich., has awarded general contract to H. K. Ferguson Co., Cleveland, for a two-story addition 50 x 100 ft., to cost about $60,000 with equipment.

St. Joseph Steel Castings Co., St. Joseph, Mich., recently organized with capital of $200,000, contemplates operation of a local plant. New company is headed by James P. McKeon, formerly assistant general manager of West Michigan Steel Foundry Co., Muskegon, Mich., and A. R. Walker, formerly president of Walker Candy Co., of same place.

Plant and business of Sauzedde Corporation, Mount Clemens, Mich., manufacturer of airplane wheels, brakes, etc., has been acquired by new interests and present company will be dissolved. A new corporation will be chartered under New Jersey laws to take over property and arrangements are being made for early removal to Bound Brook, N. J., where additional equipment will be provided.

Michigan Public Service Co., Ludington, Mich., plans extensions and improvements in local power station and system, to cost about $75,000 with new equipment. Work will start in spring.

Superior Seal & Stamp Co., 151 East Jefferson Avenue, Detroit, manufacturer of steel seals, dies, etc., is having plans drawn for a one and two-story factory, 70 x 155 ft., to cost $70,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

Mahon Structural Steel Co., 8650 Mount Elliott Avenue, Detroit, has work under way on an addition totalling 100,000 sq. ft. floor space, for storage and distributing service. It will be provided with five craneways and other material-handling and conveying equipment, with total cost close to $125,000.

Houghton Electric Co., Houghton, Mich., plans extensions and improvements in local power house and system with installation of additional equipment. Transmission lines will be extended to L'Anse and vicinity.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has awarded general contract to Everett Winters Co., Detroit, for a one-story addition, 145 x 420 ft., for metal stampings, to cost in excess of $100,000 with machinery. Albert Kahn, Inc., Marquette Building, is architect and engineer.

Winchell-Tuebner Co., Jackson, Mich., is planning construction of works for manufacture of brick at Battle Creek, Mich., including steam power house, machine shop and other buildings, and will remove headquarters to new location. It will cost more than $75,000.

Indiana

INDIANAPOLIS, Feb. 27.

PLANS are being arranged by Indian Refining Co., Lawrenceville, Ill., for a two-story oil storage and distributing plant at Fort Wayne, Ind., to cost about $60,000 with equipment. Bids will be asked late in March. Similar plant will be built at Terre Haute, Ind., to cost a like amount, for which it is expected to ask bids late in May.

Earl Little, 5 Eastern Avenue, Indianapolis, has awarded general contract to Lloyd Thompson, Indianapolis, for a one-story machine shop, 55 x 150 ft., to cost close to $20,000 with equipment.

V. M. Nussbaum & Co., Fort Wayne, Ind., are planning to purchase a 300-kw. and 200-kw. engine-generator set, each 3-phase, 60-cycle, 340-volts, with accessories.

Graham-Paige Co., West Warren Street and Detroit Terminal Railroad, Detroit, manufacturer of automobiles, has acquired former plant of Karges Wagon Co., Evansville, Ind., occupying two city blocks, and will remodel for manufacture of automobile bodies.

Metal Door & Trim Co., Laporte, Ind., is arranging to rebuild portion of plant destroyed by fire Feb. 20, with loss of $110,000 including equipment.

Pierce Governor Co., Anderson, Ind., manufacturer of speel control equipment, has increased recent financing with sale of a block of 30,000 shares of common stock, to total $540,000, a portion of fund to be used for expansion.

Mid-States Steel & Wire Co., Crawfordsville, Ind., is being organized with capital of $3,100,000 to take over and consolidate Crawfordsville Wire & Nail Co.; Dwiggins Wire Fence Co., Anderson, Ind., and Adrian Wire Fence Co., Adrian, Mich. Consolidated company will have assets of $2,000,000 in plants and equipment. J. E. Vandeventer will be chairman of board of new company, and John Sommer, president. Headquarters will be maintained at Crawfordsville.

Lanahan & Dunphy, Vincennes, Ind., have plans for a one-story automobile service, repair and garage building, to cost about $100,000 with equipment.

Board of Education, Mount Vernon, Ind., is considering installation of manual training equipment in a new two-story and basement high school, to cost $175,000, for which bids will be received on general contract March 29. N. S. Spencer & Son, 180 North Michigan Avenue, Chicago, are architects.

S. G. Taylor Chain Co., Hammond, Ind., has awarded contract to Chicago Industrial Construction Co., for a two-story addition.

Buffalo

BUFFALO, Feb. 27.

ARRANGEMENTS are being concluded for a merger of Brockway Motor Truck Corporation, Cortland, N. Y., and Indiana Truck Co., Marion, Ind., under first noted name. New organization will have combined assets totaling $9,000,000. Both plants will be continued for manufacture of motor trucks and parts, as well as 38 direct factory branches. Consolidated company plans expansion betterments, to include facilities for larger output and operations in foreign countries. Capital stock will be increased from $1,500,000 to $3,000,000, and common stock from 150,000 to 500,000 shares, no par value. George A. Brockway is president.

Board of Education, Watertown, N. Y., is considering installation of manual training equipment in a two-story junior high school to cost in excess of $250,000. Lansing & Green, Sherman Trust Building, are architects.

Rochester Gas & Electric Corporation, Rochester, N. Y., is disposing of bond issue of $6,000,000, a portion of proceeds to be used for expansion and improvements, including transmission line construction.

Evan E. Jones, 31 North Ryan Street, Buffalo, and Clarence D. Fulton, 20 Hubbell Avenue, have organized Jones-Fulton Corporation, to establish and operate a local

plant for manufacture of metal products. It is purposed to begin operations soon.

General Drop Forge Co., 1728 Elmwood Avenue, Buffalo, has taken bids on general contract for a one-story addition, to be used largely as a machine shop and to cost close to $100,000 with machinery. Ernest McGeorge, 3030 Euclid Avenue, Cleveland, is architect and engineer.

Curtiss Aeroplane & Motor Co., 74 Kail Street, Buffalo, is arranging for increase in capital from 218,000 to 300,000 shares of stock, a portion of fund to be used for expansion. An associated company, recently formed by Glenn Curtiss and others, is completing plans for erection of a new plant in vicinity of St. Louis, for manufacture of commercial airplanes and parts.

Board of Education, Liverpool, N. Y., plans installation of manual training equipment in a two-story junior and senior high school to cost about $300,000, for which bids will soon be asked on general contract. Prof. Earl Hollenbeck, Joseph Slocum College, Syracuse, N. Y., is architect.

Vacuum Oil Co., Rochester, N. Y., with branch oil refinery at Olean, N. Y., is arranging increase in capital from $70,000,000 to $175,000,000, portion of fund to be used for expansion in production, including operations in foreign countries, particularly England, where storage and distributing plants are planned. George P. Whaley is president.

Hart & Crouse Co., Utica, N. Y., has been made national distributer of Zephyr washed air system for warm air furnaces, and a part of new device will be manufactured at its Utica plant. Change will require a doubling of Hart & Crouse furnace casting production.

Lincoln Aluminum Health Co., Rochester, N. Y., will establish a plant at Port Leyden, N. Y. An existing building has been obtained and machinery will be installed immediately.

Liberty Dining Car Corporation, Buffalo, has been organized to manufacture lunch wagons. It has taken over plant of Buffalo Truck Corporation at Clarence, N. Y., which is already equipped for manufacturing.

Principal business offices of Coplan Steel Corporation will be moved from Oswegatchie, St. Lawrence County, N. Y., to New York City.

Cincinnati

CINCINNATI, Feb. 27.

WITH the majority of machine tool companies February has failed to come up to expectations, sales having been below those in either December or January. There is a small number of builders, however, who report that fresh bookings this month have exceeded those in January, so that the average decline in orders in the local market should not be more than 10 to 15 per cent. Despite the recession in the past 30 days, business in the first two months of 1928 has been from 15 to 20 per cent better than in the same period of 1927. The amount of outstanding quotations is large and a liberal percentage should close before the end of the first quarter. Buying has been well apportioned among consuming industries.

Purchases in the Detroit district have slumped sharply, although one or two companies making special high production tools report considerable pending business in the automobile field. An increase in the price of at least one type of machine which was not affected by the recent upward revision is anticipated in the near future. The Los Angeles Gas & Electric Corporation, Los Angeles, has bought a 36-in. x 28-ft. heavy-duty engine lathe.

Covington Industrial Club, Covington, Ky., is interested in a project for establishment and operation of a foundry in a building at Fifteenth Street and line of Louisville & Nashville Railroad. A group of interests formerly identified with Gates Foundry Co., Cincinnati, headed by C. W. Gates, W. H. Haven and J. C. Clifton, all of Cincinnati, are organizing New Insurance Foundry Co., to carry out project. Structure will be remodeled and equipment installed at early date.

Gray-Elliott Furniture Mfg. Co., Greenfield, Ohio, is planning to rebuild portion of three-story plant destroyed by fire Feb. 13, with loss reported at more than $70,000 including equipment.

Tietig & Lee, Merchants Building, Cincinnati, architects, have plans for an eight-story automobile service, repair and garage building, to cost $850,000 with equipment.

Air Corps, Material Division, Wright Field, Dayton, Ohio, will receive bids March 7 for saw blades, drills, drill grinding gages, saw frames and other tools, circular 243; also for bushings, pipe couplings, nipples, tees, etc., circular 250; until March 5 for 50 propeller disks, and 10 propeller club assemblies, circular 241.

United States Foil Co., Thirtieth Street and Grand Avenue, Louisville, will soon take bids for a three-story plant unit, 112 x 200 ft., and one-story warehouse and distributing plant on adjoining site, 100 x 200 ft., to cost $400,000 with equipment. Ossian P. Ward, Lincoln Bank Building, is architect.

General Aeronautical Corporation, 3336 Trimble Avenue, Cincinnati, has asked bids on general contract for a one-story airplane manufacturing plant in the Luken airport district, to cost about $50,000 with equipment. C. G. Dietz is head.

Ferro Concrete Construction Co., Cincinnati, has secured contract for a multi-story automobile service, repair and garage building to cost $200,000 with equipment.

Henry Vogt Machine Co., Tenth and Ormsby Streets, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded general contract to H. A. Doll, Louisville, for a two-story addition, 80 x 240 ft., to be equipped as a steel fitting shop, to cost $75,000 with machinery. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

Sterling Plumbing Supply Co., Inc., Louisville, has been organized to engage in wholesale jobbing of plumbers' and steam fitters' supplies. It will not do any manufacturing.

Pacific Coast

SAN FRANCISCO, Feb. 23.

AN appropriation of $22,500,000 is being arranged by Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, for expansion and improvements, to include construction of two hydroelectric generating plants on Mokolumne River in Jackson and Amador Counties, with steel tower transmission line to a point near San Francisco; and new 50,000-h.p. capacity steam-operated electric power plant at Oakland.

Club Aluminum Co., 1250 Fullerton Avenue, Chicago, manufacturer of aluminum cooking utensils, is reported planning purchase of site in vicinity of San Francisco for a Pacific Coast branch plant. Branch offices are at 981 Mission Street, San Francisco.

Brunswick-Balke-Collender Co., 845 South Los Angeles Street, Los Angeles, manufacturer of talking machines, billiard tables, etc., will erect one-story plant, 177 x 320 ft., in Union Pacific industrial tract, to cost about $100,000 with equipment. An 80-hp. boiler plant will be installed. Bids will soon be asked on general contract. John P. Krempel and Walter E. Erkes, Bank of Italy Building, are architects. Headquarters are at 623 South Wabash Avenue, Chicago.

Union High School District, Redwood City, Cal., has authorized plans for an addition to local high school, including a vocational training department. Bond issue of $250,000 has been approved.

A. M. Gilstrap, 3002 Logan Street, Oakland, Cal., and associates are planning construction of a fruit canning plant at Yuba City, Cal., including cold storage and refrigerating plant. Entire project is reported to cost in excess of $350,000 with machinery.

Arizona Wax Paper Co., Benson, Ariz., Charles Goetz, head, is considering erection of two-story mill, 45 x 100 ft., at Salinas, Cal., to cost close to $50,000 with equipment.

Federated Metals Corporation, 163 East Water Street, Portland, has awarded general contract to Reiners & Jolivette, Railway Exchange Building, for a one-story plant, 50 x 100 ft., to cost $55,000 with equipment.

Columbia Valley Lumber Co., foot of Cornwall Avenue, Bellingham, Wash., is considering erection of new mill with electrically-operated machinery, to cost about $90,000.

American Laundry Machinery Co., Norwood Station, Cincinnati, has acquired property on Elliott Avenue, Seattle, and contemplates erection of a factory branch and distributing plant.

E. C. Anthony, 2111 Webster Street, Oakland, Cal., has completed plans for a three-story and basement automobile service, repair and garage building, to cost about $150,000 with equipment.

Sacramento Pulp & Paper Co., 3245 Tenth Street, Sacramento, Cal., has plans for a new pulp and paper mill near Sacramento, using grape vine cuttings as raw pulp material, to cost upward of $400,000 with machinery. C. A. Kieren, Portland, is engineer.

San Joaquin Light & Power Corporation, Fresno, Cal., is arranging an expansion and improvement program to cost about $9,100,000, of which more than $1,500,000 will be used for construction of steel tower transmission lines. Other work will include generating plant additions, substations, etc.

Pure Iron Culvert Mfg. Co., Portland, Ore,, branch of American Rolling Mill Co., will build factory at Gladstone Avenue, to cost $50,000. It is scheduled for completion within 60 days.

Federated Metals Corporation, 163 East Water Street, Portland, Ore., branch of Great Western Smelting & Refining Co., will erect new building at Fifteenth and Irving Streets, costing about $50,000.

Portland Wire & Iron Works, Portland, Ore., has moved from Second and Columbia Streets, to new building at 944 East Seventeenth Street.

John A. Lambie, formerly of West Coast Pipe & Steel Co., Los Angeles, has organized Superior Culvert & Flume Co. and has purchased property on Union Street, Oakland, for erection of a factory.

Bellco Machine Co., Portland, Ore., has been formed to succeed former Bell Ice Machine & Mfg. Co., East Thirty-fifth and Alder Streets. A general machine shop will be operated and expansion is planned. Baby Bliss concrete brick machines will also be manufactured.

Foreign

A COMPANY at San Salvador, Salvador, has secured a concession from Ministry of Finance for construction and operation of a local plant for production of industrial alcohol and will soon begin work. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference San Salvador No. 265099; also at American Consulate, San Salvador, LeRoy F. Beers, vice-consul.

Russian Timber Trust, Petrograd, Russia, is planning an expansion and improvement program in 1928 to cost $5,150,000, including completion of new saw and lumber mills at Mezensk, Dubrovsk, Volininsk, and Ustludjsk, and veneer mills at Vitebsk and Povoldsjk, with erection of similar plants at other location. A considerable portion of fund will be used for machinery. Information at American-Russian Chamber of Commerce, 143 West Fifty-seventh Street, New York.

Imperial Chemicals, Ltd., associated with Synthetic Ammonia & Nitrates, Ltd., London, England, will carry out an expansion and betterment program at its plant on Tees River, to cost close to $5,000,000. Contract for extension to pulverized fuel division has been let to International Combustion, Ltd., London.

Government of Palestine, Jerusalem, has arranged fund of close to $6,000,000 for public works construction and improvement. Of this amount, about $4,800,000 will be used for harbor and dock construction at Haifa, approximately $500,000 for port improvements at Jaffa, both projects to include installation of material-handling and conveying machinery, loading equipment, etc.; about $175,000 for expansion and improvements in railroad mechanical and maintenance shops, with additional tools and equipment; and close to $750,000 for construction and equipment of Government offices, etc. American Consulate, Jerusalem, Oscar S. Heizer, consul, has information regarding projects.

Pirelli, Ltd., Rome, Italy, manufacturer of automobile tires and other rubber goods, is contemplating construction of a new plant at Eastleigh, Hampshire, England, to cost in excess of $250,000 with machinery. It is proposed to have unit ready for service early next fall.

Canada

TORONTO, Feb. 27.

MACHINE tool sales show steady improvement. The automotive industry is responsible for the greater part of the current demand, some good-sized lists from this source having been closed and others are being figured on. There is also an active demand for equipment from northern Ontario mining fields, and some large orders have been placed for shipment to the Flin Flon district of northern Ontario. It is expected that for the next six months at least demand for mining machinery and power development equipment will be strong.

Although no lists are out from the railroads, there is a steady flow of orders for one to a half-dozen tools. Leading iron and steel mills are planning extensions which will involve the purchase of several million dollars worth of equipment this year.

Gordon Collins, Hamilton, Ont., has concluded arrangements to take over a building at Bronte, Ont., to operate under name of Bronte Chaplet & Mfg. Company, Ltd. Products will include tin chaplets, stamping goods, etc.

Knight Mfg. & Lumber Co., Ltd., Meaford, Ont., is asking for prices on woodworking and lumber machinery.

W. G. Lee, Markdale, Ont., is asking for a lath machine and other woodworking equipment.

Alexander J. Grant, engineer in charge of Welland Ship Canal, states that a 600-ft. drydock will be built at Port Weller, Ont. Tenders for construction will be awarded immediately and it is expected that work will start early in spring.

Dominion Envelope & Carton Co., Toronto, has taken out permit for erection of a paper mill and engine room to cost $195,000.

Quebec Power Co., Quebec, has plans for a new power house on Queen Street, which will be fed by branch transmission line from terminal at Limoilou, and installation of 3500 ft. of new line at a cost of $400,000. Company also proposes to build a new power plant in Lower Town, St. Malo and Limoilou. Construction of Quebec plant will start in March.

Town Council, Leamington, Ont., plans installation of two centrifugal waterworks pumps with 115-ft. head each, to be driven by independent motors.

Beatty Brothers, Fergus, Ont., manufacturers of electric washing machines, hydrants, machinery, etc., have let contract to G. H. Thomas & Sons, 45 Dickson Street, Galt, Ont., for a one-story plant in four sections, 192 x 192 ft., 96 x 96 ft., 96 x 72 ft., and 48 x 76 ft. Construction will start in about two weeks.

T. C. Ephgrave, 310 London Street, Peterborough, Ont., has contract for erection of a three-story $15,000 addition, 30 x 34 ft., to plant of Peterborough Lock Mfg. Co., Ltd., 198 Simcoe Street, and rebuilding of portion recently destroyed by fire.

Western Canada

It is reported from Winnipeg, Man., that Callinan Flin Flon Mines, Ltd., will spend $1,000,000 this year on erection of buildings and installation of machinery. William Forbes will be in charge.

Canadian Pacific Railway, head office Montreal, plans construction of locomotive and freight car shops at Winnipeg. It will also remodel power plant at Brandon, Man.

British Columbia Electric Railway Co., Vancouver, B. C., contemplates erection of addition to power plant on Jordan River near Victoria, B. C.

NEW TRADE PUBLICATIONS

Dry Quenching of Coke.—Dry Quenching Equipment Corporation, 200 Madison Avenue, New York. Catalog DQ-2 of 30 pages describes in detail, with many illustrations, the quenching of coke by the dry process in accordance with the Sulzer system. This is the method which was described in some detail in THE IRON AGE of Feb. 10, 1927, at page 425. Most of the plants in operation are in Europe. The one mentioned above and somewhat featured in the catalog is at Rochester, N. Y. Recovery of the heat in the coke and a number of collateral advantages are pointed out as following the use of this system.

Small-Sized Temperature Recorder.—Bristol Co., Waterbury, Conn. Four-page folder describing Model 144 recording thermometer, with 4-in. chart giving record for three days. It is entirely self-contained in a neat clock-like case and is suitable for greenhouses, residences, refrigerators and cold rooms.

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